The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

VOL. I. SEPTEMBER 27, 1919 No. 15.

Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to "The Chemical Age" is 21/- per annum for the United Kingdom, and 26/- Abroad. Cheques, P.O.O.'s, and Postal Orders should be payable to Benn Brothers, Ltd.

Editorial & General Offices—8, Bouverie Street, London, E.C.4.
Telegrams: "Allangas, Fleet, London." ***Telephone: City 9852 (4 lines).***

British Trade Statistics

VOLUME I. of the Annual Statement of the trade of the United Kingdom with Foreign Countries and British Possessions during 1918, compared with the four preceding years, which was issued on Tuesday as a Blue Book (Cmd. 342, 7s.), deserves to be studied by everyone concerned in national trade, and perhaps most of all by those who trifle irresponsibly with the idea of great class strikes. The following three tables, taken from the official returns, show the total volume of our imports and exports. The first gives the value of the total imports of merchandise from Foreign Countries and from British Possessions (including Protectorates):—

	From Foreign Countries.	From British Possessions.	Total.
	£	£	£
1914 ..	508,833,541 ..	187,801,572 ..	696,635,113
1915 ..	580,068,123 ..	271,825,227 ..	851,893,150
1916 ..	645,833,842 ..	302,672,650 ..	948,506,492
1917 ..	705,134,305 ..	359,030,373 ..	1,064,164,678
1918 ..	893,115,932 ..	423,034,971 ..	1,316,150,903

The value of the total exports of produce and manufactures of the United Kingdom was as follows:—

	To Foreign Countries.	To British Possessions.	Total.
	£	£	£
1914 ..	259,091,859 ..	171,629,498 ..	430,721,357
1915 ..	236,448,764 ..	148,419,684 ..	384,868,448
1916 ..	320,103,836 ..	186,175,871 ..	506,279,707
1917 ..	354,421,930 ..	172,657,816 ..	527,079,746
1918 ..	323,056,875 ..	178,362,122 ..	501,418,997

The value of the total exports of Colonial and Foreign merchandise was:—

	To Foreign Countries.	To British Possessions.	Total.
	£	£	£
1914 ..	83,216,430 ..	12,257,736 ..	95,474,166
1915 ..	86,694,188 ..	12,367,993 ..	99,062,181
1916 ..	83,032,605 ..	14,533,573 ..	97,566,178
1917 ..	62,183,372 ..	7,494,089 ..	69,677,461
1918 ..	25,853,749 ..	5,091,332 ..	30,945,081

Taking the section in the returns which most immediately affects our readers, namely, that including chemicals, drugs, dyes, and colours, we have the following figures relating to imports:—

	From Foreign Countries.	From British Possessions.	Total.
	£	£	£
1914 ..	10,527,406 ..	1,537,024 ..	12,064,430
1915 ..	15,438,337 ..	3,890,683 ..	19,329,020
1916 ..	22,344,032 ..	6,278,020 ..	28,622,052
1917 ..	22,536,157 ..	5,491,386 ..	28,027,543
1918 ..	32,025,504 ..	6,496,080 ..	38,521,584

The value of the total exports of chemicals, drugs, dyes, and colours of the United Kingdom was as follows:—

	To Foreign Countries.	To British Possessions.	Total.
	£	£	£
1914 ..	13,538,354 ..	5,969,707 ..	19,508,061
1915 ..	15,103,441 ..	6,965,122 ..	22,068,563
1916 ..	18,206,404 ..	9,358,683 ..	27,565,087
1917 ..	15,721,438 ..	7,861,701 ..	23,583,139
1918 ..	15,594,059 ..	7,069,089 ..	22,663,148

The value of the exports of foreign and Colonial chemicals, drugs, dyes, and colours was as follows:—

	To Foreign Countries.	To British Possessions.	Total.
	£	£	£
1914 ..	1,238,807 ..	259,131 ..	1,497,938
1915 ..	2,806,275 ..	325,297 ..	3,131,572
1916 ..	4,967,198 ..	429,631 ..	5,396,829
1917 ..	2,958,949 ..	353,595 ..	3,312,544
1918 ..	2,377,640 ..	507,022 ..	2,884,662

If it is recognised that national prosperity corresponds with the ratio of our imports to exports, the gravity of the position becomes at once apparent. Our imports in the last year of the war were roughly double what they were in the first year. Our exports of United

Kingdom produce in the same period increased by £70,697,640, and that is the only satisfactory feature in the statistics. Our exports of foreign and Colonial merchandise dropped no less than two-thirds (one-third in 1918); in other words, from £95,474,166 to £30,945,081.

The figures relating to chemicals, drugs, dyes, and colours correspond in the main with the general trend of trade. The imports have rather more than trebled, from £12,064,430 to £38,521,584, while the exports of United Kingdom chemicals have increased a little over three million sterling. There is, however, a notable difference in the exports of foreign and Colonial merchandise, for while the total value of this trade has fallen from 90 to 30 million sterling, the value of the exports of foreign and Colonial chemicals, etc., has nearly doubled, from £1,497,938 to £2,884,662. In this one item the chemical industry at least may find some satisfaction as compared with the serious returns of our trade as a whole. No more convincing evidence than these new trade returns could be offered of the urgent need of restoring to British industry not only its old but a greatly increased activity, and of securing the hearty co-operation of all classes in an effort to bring this about.

In our present number we give some further details respecting our imports of chemicals, etc., and the corresponding figures relating to chemical exports will be published in succeeding issues.

Fuel Economy

THE report on fuel economy in iron and steel works, prepared by Professor W. A. Bone, Sir Robert Hadfield, and Mr. Alfred Hutchinson, and presented to the annual meeting of the Iron and Steel Institute, shows how far our present practice is from the "practical ideal" which the committee have in view, and the urgent need of vigorous investigation so as to minimise the waste that now occurs. The committee feel themselves warranted in regarding the consumption of no more than 1.75 tons of good coking coal per ton of finished steel sections produced as a "practical ideal" for a modern British plant comprising coke-ovens, blast-furnaces, steelworks, and rolling-mills, properly disposed on one site, and under one control and management. Among the essential conditions for its attainment they mention the following:—(1) By-product coke-ovens, blast-furnaces, steelworks, and rolling-mills should all be concentrated on one site, and suitably laid out in relation to each other. (2) The by-product coke-ovens should be of the regenerative type, so as to yield the largest possible amount of surplus gas. (3) The blast-furnaces should be fitted with double bells in order to minimise loss of gas. The blast should be generated by means of a gas-driven blowing engine. There should also be a proper distribution of the materials in the furnace by means of a suitably dimensioned bell. (4) The gases leaving the furnace should be dry-cleaned, preferably by some electrostatic method, so as to reduce their dust content to about 0.1 gramme per cubic metre. The hot-blast stoves should be heated by this dry-cleaned gas. The gas intended for generating power in gas-engines must be further cleaned until its dust content does not exceed 0.015 gramme per cubic metre. (5) There should be separate supplies of surplus coke-oven and blast-furnace gases throughout the plant; the mixing of two should be carried out at the various points of consumption as required. (6) The gas-engines in the power-house should preferably be run on cleaned blast-furnace gas only. For steel furnaces and soaking pits a mixture of blast-furnace and coke-oven gases, in such proportion as will yield a heating gas of between 160 and 180 B.Th.U. per cubic foot, should be used. (7) The rolling-mills should preferably be electrically (not steam) driven. (8) There must be scientific management and control throughout the whole heating system by properly trained fuel technologists, for it is essential that every available heat unit in the plant shall be tracked down and effectively utilised to the best advantage.

The committee emphasise the point that the problem of fuel economy, as it presents itself to-day, is one rather of scientific organisation and co-ordination than of the discovery of new principles. In all the larger works there ought to be an organised staff wholly engaged, under competent direction, in controlling the fuel consumption. Such control, it is strongly urged, ought not to be relegated to a member of the technical staff whose chief attention must be given to the supervision of machines, or of operations in which the consumption of fuel is merely an incidental, and perhaps even a subordinate consideration. Our scientific knowledge regarding fuels and their combustion has developed so rapidly during the past twenty years that it has now become a separate branch of technology, for which special training is required, and without such training the ordinary works' chemist, and still more so the engineer, is not competent to handle the subject. This involves the task of training a sufficient number of competent men, and this will tax to the utmost the resources of university laboratories for fuel technology. A matter of vital importance to assist the extension of such educational facilities would be adequate financial support from the Government, and there should be a collective movement for co-operative investigation and research. It is to be hoped that our chemical manufacturers will take to heart the shortcomings of the iron and steel-works, which it is to be feared are equally applicable to many chemical works.

The Chemical Industry Club

IT was a wise and tactful act on the part of the committee of the Chemical Industry Club to take the members so frankly into their confidence as they did at the open meeting of the Club on Monday evening, and the actual conduct of the proceedings, with Mr. Pilcher in the chair, and Mr. Coley explaining the Club's policy and position, was no less tactful. The rapid advance in membership to about 650, and the steady inclusion of men of influence and distinction in chemical industry quite justify the hope of the committee that before long the membership will reach the round thousand, and the policy pursued is well calculated to secure for the Club a recognised place as one of the important institutions of British chemical life. On Monday evening, when

members were frankly invited to have their shot at any shortcomings in the management, the absence of any serious criticism was the best testimony to the committee's work, and the suggestions made as to a number of minor details were marked by good humour and a serious desire to advance the interests of the Club.

It was not intended, of course, that any formal resolutions should be passed, and some interesting suggestions were recommended for the consideration of the committee. First of all the members present seemed practically unanimous in support of the idea of creating a new post of president of the Club, to be filled annually by some man of distinction. On the point whether such an officer should be more or less of a figurehead, or strictly a working president, there was some difference of view, but fuller inquiry may show that the balance of advantage lies in the former direction. If it is intended to elect men holding really high positions and responsibilities, it will probably be found that not many such can give the time to the regular but most essential drudgery of committee work, nor, indeed, would the committee be likely to gain in efficiency by having a new chief, new to all the details and precedents of the work, every year. The proposal to have a president strongly appealed to the members, but the suggestion of also electing so many life vice-presidents struck them as likely to create difficulties, and found practically no support. It was mentioned that the increase in the secretarial duties suggested the need of appointing a paid secretary who could be in constant attendance at the Club. This, again, seemed to be generally approved, but on one very distinct condition—that Mr. Coley should retain his present office, and that any new official should be in the nature of an assistant to him. The loss of Mr. Coley's services would be a loss of the most serious kind to the Club at a stage of its development when his easy and quiet mastery of its affairs is an especially valuable asset.

These, and many other details, may be safely left to the committee, whose one concern is to make the Club as widely useful to members as possible; but on one point we should wish to be allowed to express a very definite opinion. The question was raised as to what exactly the qualifications for membership are, and a suggestion was offered that the rule might be elaborated and made more precise. This, we think, would be a great mistake. The rule, as it stands, seems admirably drawn to supply the committee with the necessary general instruction, and at the same time to reserve to them the discretionary margin which is so necessary in such cases. The committee would, no doubt, personally welcome a code of instructions which could be automatically applied to each case. It would relieve them, from time to time, of some very delicate problems, but in the interests of the Club it is not desirable so to relieve them, and since gentlemen are good enough to undertake this delicate and often thankless task, they are entitled to the fullest confidence and support of the members in the discharge of this very important service to the Club. It only remains to add that the members heard with satisfaction of the admirable arrangements in progress for the annual meeting and forthcoming Club dinner, and it is to be hoped that the latter function especially will bring in a substantial addition in the membership.

A Retort to Lord Fisher

LORD FISHER'S recent articles on the Navy must have struck many readers as a trifle mad, but no one has yet handled him quite so neatly as Professor Henry E. Armstrong does in a delightful satire on the Admiral's science, which he contributes to the *Times*. Lord Fisher's idea that the world of the future will depend supremely on oil, and that everybody possessing a back garden should begin at once boring for it, is met by the calm retort that below certain strata it is useless to go for oil, that the American oilfields are all but exhausted, and that the oilfields of the world cannot well be long-lived at the present rates of extravagant use. "To feed not only the Navy, but also the mercantile marine with oil," Professor Armstrong states, "will be impossible. It is the dream of an enthusiast carried away by his ignorance, not that of sanity. In view of the early exhaustion of oil supplies, far, far sooner than of coal, we should economise in oil rather than seek to extend and develop its use." The Professor dismisses as nonsense Lord Fisher's statement that "so long as a pound of coal exists, there exists, say, half a pound of oil with further research." Our anthracite coals, he states, do not furnish a trace of oil, and the highly bituminous at most about 20 to 25 gallons per ton, say 200 to 250 lbs. None the less, he agrees with Lord Fisher that all coal should be distilled for oil before it is burnt.

Referring with approval to the institution by Lord Fisher's efforts of special schools for the Navy at Osborne and Dartmouth, Professor Armstrong points out, however, their weakness on the scientific side. "No attempt," he writes, "has been made to teach chemistry in either of the schools, yet chemistry is the one subject through which an analytical, experimental outlook can be best acquired, and habits of logical thought developed; besides which, some real knowledge of chemistry is essential if men are to understand the life of a ship, and the proper use of explosives." As a naval tactician Lord Fisher may be excellent, but his science and his literary style of expounding it are made to look rather poor under the Professor's unfeeling analysis.

The Calendar

Oct. 1	Eastern Counties' Gas Managers' Association (Annual Meeting.)	Salisbury House, London Wall, E.C.
1	Scientific Society (Presidential address by Mr E. W. Dobbs)	Birmingham and Midland Institute
2	Streatfeild Memorial Lecture (By Professor G. T. Morgan, "Applied Chemistry in Relation to University Training.')	Finsbury Technical College.
3	Society of Chemical Industry (Manchester Section.) Chairman's Address, and Paper by Mr. J. Allan (Some Notes on the Rhineland Chemical Works.)	The Grand Hotel, Manchester.

Mechanical Handling of Chemical Materials

By George Frederick Zimmer, A.M.Inst.C.E.

In the last instalment of his article the writer deals with the problem of preventing dust, and discusses the use of conveyors for the purpose of heating and cooling materials by according them slow travel through special chambers.

IV.

VII.—*The Prevention of Dust in Order to Avoid Injury and Inconvenience to Workers and Loss to the Establishment, also by Explosion.*

Dust may be poisonous and it is in all cases injurious, and it may form an explosive mixture. For these and other reasons it must be prevented, and as it is impossible to handle dusty materials manually without raising clouds of dust, this has to be avoided in a number of ways when handling them mechanically.

We have already dealt partially with the subject in Section IV., and particularly with the pneumatic system of handling fine powders, this method being one of the most efficient, and one in which dust is completely prevented. We will now see by what means dust can be prevented when other methods of transport have to be chosen. Some of the conveyors, and particularly those which support the material like the band, apron, or tray conveyors in which the load lies undisturbed on the conveyor, produce practically no dust, if they are not running too fast. A definite speed cannot be given as this would vary according to the class of material handled. It depends mostly on the specific gravity of the objects, but as generally the fine material lies nearest the band when handling mixed substances, the resistance of the air does not interfere much with the fine particles. The objection to a comparatively high band speed, as just mentioned, lies with the dust produced at the delivery end, and for that reason many a band will have to run slower than the speeds given; we thus see that such conveyors need not be enclosed in order to avoid dust. It is rather the feeding on and off where the dust is produced, and if a band speed is chosen at which a minimum amount of dust is raised this speed will invariably be harmless as far as the main portion of the band is concerned. The two terminals, and if intermediate delivery is necessary, that also, must be enclosed when handling dusty material and the dust is withdrawn by a small ventilator and led to a dust collector. One might practically say that the speed of a band conveyor must be regulated by the dust producing attribute of the material. As in chemical works the quantities to be handled are, as a rule, so much smaller than in other industries it will not be a great extravagance to instal relatively large conveyors and run them slowly if it is imperative to produce a minimum of dust. The foregoing refers only to the band and similar types of conveyors.

Enclosed Conveyors

Pushplate, worm, and reciprocating conveyors are best entirely enclosed when handling dusty stuff as the pushing and stirring which takes place in the two former is more likely to raise dust, but this also depends upon the nature of the material, its degree of fineness and the speed of running. The pushplate conveyor is not easily enclosed, but the worm can readily be fitted with a dust-tight lid and the inlets and outlets can likewise be made dust-tight, thus leading shoots of wood or iron from and to the conveyor from the machine or apparatus from and to which the material is conveyed. An exhaust in this case is but rarely necessary. The reciprocating conveyor is very convenient in this respect as a lid is as easily fitted to it as to a worm, and allowance for the reciprocating motion of the trough is made by fitting a moleskin sleeve into the feed and delivery spout. It must, however, be mentioned that a reciprocating conveyor with a small stroke produces practically no dust, as through the peculiar motion of the conveyor the finer material is always covered by the coarser.

VIII.—*Handling Material at a High Temperature.*

Since conveyors of the pushbar type are built by the mile for handling incandescent coke there can likewise be no difficulty in handling hot material in the chemical industry by similar devices; most of the conveyors, in the composition of which there is neither textile material nor rubber, will handle stuff so hot that it cannot be touched by hand, the only drawback is the elongation due to expansion, for which, however, due allowance can be made in long conveyors. The steel band conveyors are excellent for this purpose, and among other substances they are used for hot calcium carbide and chloride of calcium. Conveyors of the pushplate type can be made with cast iron troughs, which are not much affected by the temperature of the load conveyed while the chain cools on the return journey. If the steel belt and chain conveyors are kept taut by a tension weight, any expansion or contraction will automatically adjust itself.

IX.—*The Desirability of Subjecting the Material During Conveying to a Picking, Heating, Cooling or Other Process.*

The first of these processes, sifting, can only be effected by a reciprocating conveyor, and if it is desirable to eliminate any smalls this can be done by the insertion of a few feet of perforated metal; this has invariably the advantage that the material thus freed from dust can be handled afterwards by almost any kind of handling device without causing dust. Provided there is no other consideration demanding the use of other conveyors this type has a distinct advantage. If it is desirable to heat or cool material under way, the conveyor trough can be steam jacketed, which is feasible in the case of the worm, pushplate, and reciprocating conveyor. Another method is to run a conveyor through a culvert which is either heated by steam pipes or flues. For this latter purpose all but textile rubber conveyors may be used, but as it is difficult to keep such conveyors lubricated, a type with a minimum of wearing parts should preferably be chosen. One of the best solutions is an internal worm conveyor with its supports at the outside of the hot chamber. A good solution is also an installation of a number of ordinary worm conveyors above each other or obliquely zigzagged, and made of such a length that no intermediate bearings—and therefore no lubrication—are necessary. These may be from 10 to 12 feet long, and will convey the material very slowly backward and forward, starting with the uppermost worm and dropping it on to the next one and returning it again, and so on through every successive conveyor till the material leaves at the end of the lowest. The flues around the conveyors can be so arranged that the heat gradually increases and is greatest at the lowest worm. The driving arrangements of the worm would be at the outside of the brickwork, as would be the inlets and outlets for the material. In all cases where conveyors with jacketed troughs are used, or where the conveyors pass through heated chambers the gases can be exhausted or otherwise led away by the draught of a chimney, and in a similar manner can gases be brought in contact with materials under way.

X.—*If it is Desirable that the Same Installation should at Different Times be Used for a Variety of Different Materials.*

It is, of course, pre-supposed that the process which the material has to undergo is the same. In this case all that is necessary would be to employ handling devices which empty themselves and thus avoid worm conveyors, which always have an accumulation of material in the trough, the cleaning out of which is a great task, the material in some cases having to be got out with a chisel and hammer. Push-plate conveyors, if well made, can be cleaned out with less trouble, while band, trough, and reciprocating conveyors only require to be wiped. Elevators with their wells or boots should also be avoided as they always hold an accumulation. Thus it is best, in such a handling scheme, to use one machine for conveying and elevating such as a band or tray conveyor, either of which can be got ready for a change of material in a few minutes, by means of a brush or a cloth.

Many other matters might have been mentioned on this vast subject, but space does not permit of it. There never was a time when labour-saving devices assumed such importance, and we shall not restore the industries of this war-wearied land so long as the labouring class treacherously inflicts even deeper wounds from within, and we cannot expect to reap the fruits of victory till we eliminate the so-called cheap labour for that portion which can be done cheaper, better, and more reliably by mechanical devices.

Filling Containers with T.N.T. and Amatol—II

By "Works Manager"

The first instalment of this article, dealing chiefly with T.N.T. filling, was published last week. In the following part the writer describes the use and properties of Amatol, and the methods employed in the mixing of ammonium nitrate with the other constituents.

Amatol

Amatol is the name given to a mixture of T.N.T. and ammonium nitrate, the name being derived from parts of the names of its constituents. An amatol may consist of any proportion of T.N.T. from 10 per cent. upwards, and in describing it the NH_4NO_3 content is always stated first, following the derivation of the name. Thus, 40/60 amatol contains 40 per cent. of ammonium nitrate. The commonest proportions used for military and naval work are 40/60, 50/50 and 80/20, the first-named being the most popular.

In the first part of this article, attention was drawn to the fact that T.N.T. could be safely mixed with oxidising agents. T.N.T. does not contain sufficient oxygen for complete combustion, and ammonium nitrate is a suitable medium to supply this deficiency. The theoretical amatol for complete combustion would contain 21 per cent. T.N.T. and 79 per cent. ammonium nitrate. With a readily procurable article at hand, at a price of about one-fifth (or less) of that of T.N.T. the advantage of its adoption can be readily appreciated, since the resulting explosive is a good one, and up to 80 per cent. of nitrate of ammonia can be admixed. When the Admiralty extended their mine programme, and commenced activity against submarines by means of depth charges, as much as 500 or 600 lb. of explosive was required for a single charge, so that the production of T.N.T. would not have been equal to the demand.

Properties of Amatol

Amatol is more powerful than T.N.T., but its velocity of detonation is only 4,000 to 4,500 metres per second, and its density is lower. Hence its shattering effect is lower than T.N.T., but this is not always a disadvantage. The density gets lower as the percentage of ammonium nitrate increases, 80/20 having a density of about 1.35 at a pressure of 1 to 2 tons per square inch, and 40/60 (poured) about 1.42. Amatol is not so easy to detonate at T.N.T., and gets more difficult and more inert with increase of ammonium nitrate content. T.N.T. gives a black smoke on detonation, and amatol only a grey smoke comparatively small in amount. A smoke producer packet is inserted when observations are required.

Amatol is only a mixture, as distinct from an explosive compound, and is a mixture of the simplest form, such as sand and water. In fact, the early troubles with amatol were chiefly those due to imperfect mixtures and difficulty in detonation. Ammonium nitrate is very hygroscopic, and if left in a damp atmosphere quickly runs away like water. It is sent to the filling station in galvanised drums of 100 lb., or in barrels containing from 2½ to 5 cwt. Once in store, it must be carefully watched, wet and dry bulb thermometers read twice daily, and temperatures adjusted accordingly. Apart from the wasting properties, moisture in the amatol is fatal, and before being mixed the moisture should be reduced to less than ¼ per cent. The moisture in the finished amatol should be under 0.2 per cent.

Ammonium nitrate when required for use may come from the barrel in the form of salt, or in a solid block. Before dealing with the further steps in the making of 40/60 mixture by melting, it is desirable to give the various ways of making amatol. These are as follows:—

(*a*) Milling in any form of mill, for any proportion of amatol, but usually 80/20.
(*b*) Melting and pouring, 40/60 or 50/50 amatol.
(*c*) Hot-mix, 60/40 or 80/20 amatol.

The milled material can be pressed into blocks or stemmed direct into containers. The hot-mix (which will be briefly described later) is tamped or stemmed into the container, while the poured charge can be poured direct into the container, or into paper case blocks, as in the case of T.N.T. It will be readily seen that an intimate mixture of the two constituents is highly necessary, and either method of mixing will produce this if carefully carried out, but stemming is not an ideal method of obtaining uniform density in a charge. So that to satisfy all requirements the 40/60 poured charge justified its popularity.

Preparation of Ammonium Nitrate

Before being actually mixed, the ammonium nitrate for the poured charge must be dried and heated to a temperature of about 180° F. The salt, if in large pieces, is broken down with a sledge hammer and chisel and put into a breaker of the roller, or claw type, and further broken down. It is then passed into a combined miller and dryer, or a heater of the sugar-dryer type. The best method is the former, which consists of a steam-jacketed cylinder with a horizontal driving shaft and double sets of spiral blades, the outer set fitting nearly tight to the cylindrical inner jacket. After a certain period, depending on the weight of the charge and the condition of the material when put in, the sliding door is opened at

the floor of the cylinder and the salt comes out as a hot, floury-looking powder, ready for admixture with the T.N.T. The mixing is done in steam-jacketed pans, and the proportions can be adjusted by gauges, checked against the measurements of the separate constituents. The resultant mixture is like thick porridge, and thicker when 50/50 is used than 40/60. In fact, the former proportion cannot be attained unless both constituents are hot. The mixing is gradual, and can be done by hand or automatic mixers, and should continue until all the amatol from the pan is used.

After filling the containers, precautions must be taken against moisture, for amatol is hygroscopic, however small its proportion of ammonium nitrate. A sealing of T.N.T. is placed over the completed charge to prevent the damp getting in, and in the case of block charges, those pressed from milled amatol are waterproofed before being wrapped, and those poured into paper cases are waterproofed immediately on being taken out of the moulds. The sealing is done with Grade II T.N.T. to avoid exudation.

Hot-Mix

The hot-mix method appears to be an endeavour to combine the advantages of the poured charge, and yet restrict the use of T.N.T., for, as pointed out above, 50 per cent. is the maximum amount of ammonium nitrate which can be put in when poured. In this method, automatic mixers are essential, and the quantities which can be dealt with in a vat are smaller than in the case of one of the same size used for the melt. The ammonium nitrate is prepared in the same way. The steam-jacketed pan with spiral blades on a vertical shaft is used, and the correct proportion of ammonium nitrate is put in, followed by the amount of molten T.N.T. After the mixing is completed, the molten T.N.T. has deposited itself, filmwise, round the grains of ammonium nitrate, and the finished product is of the consistency of putty when hot, and in that state is stemmed into the container. It is stemmed to gauge, and in the case of shells the former has to be driven in with a certain amount of force, for the mixture rapidly cools and the change in the physical state is marked. A small amount placed on the palm of the hand becomes "sugary" and crumbly in a couple of minutes.

Although the moisture problem had to be contended with in the case of amatol, yet the exudation trouble was partly overcome, for the larger the percentage of ammonium nitrate, the less was the exudation from the same bulk. It is seen from the foregoing brief description that considerable changes in the plant, or rather additions, became necessary when the filling stations were changed from T.N.T. to amatol. One of the advantages of the change, in preference to adopting a new type of explosive, was that no drastic scrapping of plant was necessary. Further, a factory designed for amatol, or altered to admit of it, could always be adapted for T.N.T. filling again, as a whole or in part.

Priming and Detonation

All containers, whether shells, mines, or bombs, are detonated by application of the same principle, viz., a graduating series of explosions or detonations of decreasing sensitiveness (commencing at the fuze or hammer), and increasing in quantity and violence. The explosives generally used for this series of actions are selected from gunpowder, fulminate of mercury, picric powder, T.N.T. powder, and tetryl. The initial detonation is usually effected by a small charge of fulminate of mercury ($C_2N_2O_2Hg$), or, in special cases, by lead azide (N_6Pb) alone, or in addition to fulminate. These two substances are very sensitive and violent, and are therefore effective as initiators of detonation, fulminate being about one-fifth of the value of lead azide. The latter is, in fact, too sensitive for ordinary use. There are many makes of detonators, which may be broadly divided into two classes, electric and non-electric. They may contain fulminate only, or combined with tetryl. Detonators in the ordinary sense of the word are not used in shells, the initial detonation being effected by the fuze, the exploder bag of picric powder, tetryl, or T.N.T. powder following, or alternatively, the combined fuze and gaine. Sometimes a further step is introduced by the insertion of a core of special filling of, say, T.N.T. in an Amatol shell, which may be regarded as a primer.

In mines and large containers, carrying heavy charges, it is essential that there should be no defects, for no guns are handy to send another round should the first prove faulty. Thus the priming charge, as well as the initial detonation, becomes of great importance. The priming charge may consist of compressed T.N.T., compressed tetryl, or a combination of both, in which case the tetryl is placed nearest the detonator. These priming charges are usually assembled in tubes or tins, ready for insertion in the mine or charge on the ship. The blocks are made by compressing the powder under hydraulic pressure, and here again uniform density is highly desirable. The pressure used for T.N.T. is higher than that for tetryl.

Tetryl

This is a lemon yellow, finely crystalline powder, melting at 130° C. It is more sensitive than T.N.T. or lyddite, and has a velocity of detonation of about 7,000 metres per second. Its chemical name is tetra-nitro-methyl-aniline ($C_6H_2(NO_2)_3NCH_3NO_2$), and is known in the services as C.E. (composition, exploding). Its value as an intermediary or primer lies in the fact that its sensitiveness lies between that of the fulminate and the main container filling.

Its specific gravity, when compressed suitable for mine primers, is 1.56 to 1.58. The usual precautions have to be taken for guarding the health of the workers; in fact, tetryl workers and press-hands generally give more trouble than those engaged on the melt process. Both T.N.T. and tetryl can be pressed with steel dies, although soft metals are safer. But with either metal, and for either powder, adequate protection is necessary round the presses. This may be effected by rope mantlets, steel plates, or concrete walls, the operator at the valves using mirrors for the inspection of the operations of pressing and ejecting the finished block or pellet. In the case of heavier blocks, the operator should be in a different room, with a substantial buttress or fort between, the progress of the rams being indicated by any automatic means, such as ropes and weights, or an index running up and down a glass tube.

Calico Printers' Association

Mr. L. V. Lee, presiding at the annual meeting of the Calico Printers' Association in Manchester last week, said that trade in this country is suffering from the fall in the European exchanges, which gives great assistance to some of our foreign competitors. In the case of most of the new and war-devastated States of Europe the exchange situation is so bad that they cannot pay, and we are under the necessity, so far as lies in our power, of financing them until they are in a position to export produce. The shortage of dyes is still acute. The company utilise British products wherever they can, but they are still largely dependent on Swiss supplies, which are insufficient in quantity and range to meet their needs, and it is obvious that advantage must now be taken to obtain a share of the stocks and output of German colour secured by the Reparation Committee of the Allies under the peace treaty. The recent rise in the cost of coal will increase the company's annual coal bill by about £120,000. It requires about ten tons of coal for each ton of cloth manipulated. One of the most serious problems manufacturers in this country are faced with is that of foreign competition. The United States hope to capture our overseas markets, and admit having all the financial backing they require, while new methods will have to be devised to meet their formidable Japanese competitors, who are in a more powerful position than ever as compared with other nations suffering from the aftermath of the war. The report was adopted, and a dividend of 5 per cent. on the ordinary shares for the past year was sanctioned.

Annual Board of Trade Returns

Chemical Imports for the past Five Years

The annual statement of the trade of the United Kingdom with foreign countries and British Possessions, 1918, compared with the four preceding years, was issued on Tuesday. We give below the quantities and value of imports of chemicals, drugs, dyes, colours, &c.; the figures relating to exports will appear in future issues.

IMPORTS OF ARTICLES OF FOREIGN AND COLONIAL MERCHANDISE

(Articles subject to Duty on Importation are printed in *Italics* in the first column)

ARTICLES.	QUANTITIES.					VALUE.				
	1914.	1915.	1916.	1917.	1918.	1914.	1915.	1916.	1917.	1918.
						£	£	£	£	£
Asbestos, Raw .. .. .. *Cwts.*	294,285	510,459	534,237	308,718	397,736	181,010	359,822	537,496	403,585	829 038
Asphalt, or Bitumen (other than Painters' Colours or Drugs) .. *Tons*	98,430	70,019	49,121	43,122	41,643	265,921	276,238	284,834	319,470	515,017
Chemical Manufactures and Products (other than Drugs, Dye Stuffs and Manures) not liable to duty:										
Acetate of Lime .. .. .. *Cwts.*	84,311	101,267	68,124	43,181	21,759	38,919	84,228	146,873	107,793	62,438
Acetic Acid, other than for table use .. .. ,,	77,917	103,267	58,881	104,247	89,753	93,646	213,681	370,149	667,894	573,878
Acetone .. .. ,,	47,204	115,554	51,824	125,444	173,982	138,813	524;877	293,219	770,570	1,350,900
Bleaching Materials:										
Bleaching Powder .. .. ,,	100,162	17,512	5,050	3,247	28	25,300	10,035	4,080	6,459	26
Other Bleaching Materials .. ,,	6,175	344	80	—	40	3,521	267	82	—	169
Boracite .. .. ,,	108,102	—	11,000	—	6,546	47,518	—	11,275	—	6,800
Borate of Lime .. .. .. ,,	281,533	389,147	341,896	252,953	162,524	117,969	181,222	226,483	261,328	211,981
Borate of Magnesium .. .. ,,	—	—	—	—	—	—	—	—	—	—
Borax .. .. ,,	13,562	25,232	18,126	37,489	16,485	12,077	27,680	25,637	61,258	36,504
Brimstone .. .. ,,	435,979	711,102	680,593	587,835	1,454,393	107,585	205,489	298,076	290,045	973,920
Carbide of Calcium .. .. ,,	575,443	521,523	489,785	376,408	517,262	307,531	293,188	328,724	425,849	836,846
Coal Products, not dyes .. .. ,,	131,778	54,154	34,049	42,762	13,661	118,475	68,852	255,538	517,431	136,801
Cream of Tartar .. .. .. ,,	66,691	54,337	36,732	38,388	39,701	329,533	400,044	313,284	339,277	604,527
Glycerine—Crude .. .. ,,	85,293	95,755	52,393	7,900	63,490	258,200	272,029	101,007	43,518	491,404
—Distilled .. .. ,,	15,613	40,813	22,970	15,831	29,785	65,769	165,862	104,144	128,824	376,937
Muriate of Ammonia .. .. ,,	4,599	3,017	782	215	—	5,973	3,789	816	158	—
Potash Compounds:										
Saltpetre (Nitrate of Potash) .. *Cwts.*	209,439	276,580	439,263	397,418	383,689	230,244	382,966	807,739	841,029	835,921
Other Sorts .. .. .. *Value*	—	—	—	—	—	491,401	493,626	635,030	529,155	450,057
Soda Compounds:										
Soda Ash .. .. .. *Cwts.*	4,663	12,037	7,901	2,580	—	1,338	4,844	5,870	3,769	—
,, Bicarbonate .. .. ,,	131	—	—	—	—	111	—	—	—	—
,, Caustic .. .. .. ,,	28,310	32,951	47,634	15,938	379	14,003	20,827	67,155	32,418	979
,, Crystals .. .. .. ,,	26,462	292	—	—	220	5,408	71	—	—	251
,, Other Sorts .. .. ,,	138,732	146,842	97,784	104,053	92,998	147,122	244,645	276,632	346,911	412,007
Sulphuric Acid .. .. .. ,,	123,509	119,417	5,722	5,047	1,886	10,693	48,687	2,584	12,442	7,073
Tartaric Acid .. .. .. ,,	40,222	34,559	35,668	15,752	14,980	228,013	265,630	494,069	207,898	223,868
Unenumerated Chemical Manufactures and Products (other than Drugs, Dye Stuffs and Manures) .. .. .. *Value*	—	—	—	—	—	1,281,428	3,580,545	7,500,023	8,784,113	18,030,444
Chloral Hydrate .. .. .. *Lbs.*	27,296	51,357	60,550	41,013	75,562	2,849	11,079	27,298	13,059	30,080
Chloroform .. .. ,,	3,128	1,545	1,048	26,553	14,106	1,233	1,919	1,583	2,718	2,286
Manufactured Fuel .. .. .. *Tons*	1,160	800	336	154	25	7,576	6,992	3,214	885	50
Drugs, containing no dutiable ingredient:										
Bark, Peruvian .. .. .. *Cwts.*	33,346	20,416	27,141	33,934	29,140	75,224	55,819	128,168	227,177	227,528
Cocaine and Cocaine Salts .. *Ozs.*	28,480	66,603	55,914	20,584	15,814	9,322	28,727	26,860	13,568	19,662
Morphia and Morphia Salts .. ,,	3,306	242,205	48,158	—	—	1,368	126,602	40,835	—	—
Opium .. .. *Lbs.*	860,220	951,713	694,880	819,091	439,929	736,682	1,020,672	653,234	894,310	431,779
Quinine and Quinine Salts .. *Ozs.*	1,868,515	4,581,646	3,727,022	5,019,967	2,380,149	102,410	320,992	519,197	554,137	306,099
Unenumerated Drugs (including Medicinal Preparations) .. *Value*	—	—	—	—	—	1,226,584	2,147,178	2,885,241	2,264,278	2,514,988
Dye Stuffs (other than Dye Woods) and Substances used in Tanning or Dyeing:										
Dye Stuffs:										
Cochineal .. .. .. *Cwts.*	2,634	2,229	6,605	516	622	25,261	21,381	92,333	5,781	9,882
Cutch .. .. ,,	59,568	91,828	131,238	47,513	59,367	80,938	131,758	257,953	96,635	161,414
Dyes and Dye Stuffs obtained from Coal Tar:										
Alizarine and Anthracene Dye Stuffs .. .. ,,	32,091	24	21	41	1,995	134,647	1,116	836	1,024	2,548
Aniline and Naphthalene Dye Stuffs .. .. ,,	192,369	59,630	61,185	53,052	44,668	1,105,857	892,572	1,478,543	1,714,091	1,578,188
Synthetic Indigo .. .. ,,	15,517	11,240	4,618	11,966	2,084	50,567	156,137	83,631	175,215	24,514
Other Coal Tar Dye Stuffs .. ,,	179	67	111	397	219	359	762	4,893	8,671	6,529
Extracts for Dyeing .. .. *Value*	—	—	—	—	—	138,352	346,272	671,059	1,102,783	783,263
Indigo .. .. *Cwts.*	5,314	25,157	30,527	13,501	5,287	181,695	1,256,712	1,454,540	749,597	263,605
Unenumerated .. .. ,,	150,281	221,254	206,356	190,601	176,591	336,035	528,293	670,270	683,288	777,573
Tanning Substances:										
Bark for Tanning .. .. ,,	846,276	761,623	572,891	415,737	712,190	321,450	322,158	378,205	363,907	659,840
Extracts for Tanning .. *Value*	—	—	—	—	—	972,520	1,899,459	3,309,660	1,862,649	2,428,963
Gambier .. .. .. *Cwts.*	141,971	208,748	185,499	130,561	131,565	174,253	306,698	416,983	346,133	417,251
Myrobalans .. .. .. ,,	560,600	778,984	861,729	674,377	748,130	162,941	292,297	499,629	639,563	798,591
Sumach .. .. ,,	152,006	143,333	124,811	93,595	125,187	80,996	84,040	79,420	74,246	130,596
Valonia .. .. ,,	362,734	142,456	134,349	34,850	124,344	171,392	101,922	167,117	75,945	278,433
Unenumerated .. .. ,,	23,455	64,278	62,202	4,835	17,684	12,021	44,251	63,207	9,513	34,985
Dye Woods:										
Logwood .. .. *Tons*	9,343	5,947	18,679	11,224	3,390	50,967	41,728	240,240	177,902	45,797
Unenumerated .. .. .. ,,	7,027	24,047	3,000	3,558	575	39,924	167,056	35,389	33,623	9,208
Carbons .. .. *Number*	43,847,408	39,797,586	32,128,176	16,534,047	7,654,773	124,814	141,170	82,027	75,593	33,484

IMPORTS OF ARTICLES OF FOREIGN AND COLONIAL MERCHANDISE—*continued.*

(Articles subject to Duty on Importation are printed in *Italics* in the first column.)

ARTICLES.	QUANTITIES.					VALUE.				
	1914.	1915.	1916.	1917.	1918.	1914.	1915.	1916.	1917.	1918.
						£	£	£	£	£
Ether, Acetic .. .. .. *Lbs.*	3,157	2	166	1	18	107	—	9	—	279
,, *Butyric* .. .. ..*Gallons*	33	468	238	552	—	24	314	183	345	—
,, *Sulphuric* .. .. .. ,,	361	8	2	2	11	428	105	16	108	413
Ethyl, Bromide .. .. .. *Lbs.*	43	113	—	—	—	8	57	—	—	—
,, *Chloride* .. .. ..*Gallons*	54	98	119	50	31	248	1,097	1,125	696	416
,, *Iodide* .. .. .. ,,	1	—	—	—	—	1	—	—	2	3
Glass, Window and German Sheet, including Shades and Cylinders .. .. .. *Cwts.*	754,109	470,395	480,171	114,420	16,014	443,667	454,480	595,041	174,224	61,842
,, Plate .. .. .. ,,	213,347	249,981	135,306	8,505	20	266,175	356,974	207,164	22,730	155
,, Flint, plain, cut, or ornamented, and Manufactures of Flint Glass (except bottles) .. .. ,,	733,805	572,591	683,456	87,943	36,565	951,870	723,180	1,118,809	209,596	151,382
,, Bottles .. .. .. *Gross*	1,305,400	705,675	1,430,256	384,314	112,344	574,588	440,565	968,569	216,827	77,041
,, Manufactures, unenumerated *Cwts.*	1,562	1,485	547	65	—	2,821	3,492	764	159	—
Glue, Size, and Gelatine, not containing added sugar .. ,,	215,055	145,782	124,390	51,618	63,425	448,690	382,283	390,950	276,872	528,437
,, Stock, and pieces for making Glue .. .. .. ,,	123,006	78,478	77,383	27,346	29,691	97,712	67,309	51,054	31,011	56,936
Gum, Arabic .. .. .. ,,	117,126	150,282	177,144	132,142	190,816	213,437	255,092	461,437	445,074	775,238
,, Kauri .. .. .. ,,	135,640	64,692	54,843	28,486	1,402	481,963	293,263	233,443	108,098	4,992
,, Lac-dye, Seedlac, Shellac, and Sticklac .. .. ,,	101,609	113,470	75,000	29,666	92,263	344,551	355,122	332,573	168,467	873,925
,, Unenumerated .. .. ,,	249,578	343,031	295,008	188,272	63,371	594,814	603,762	548,130	441,046	295,815
Gutta Percha .. .. .. ,,	52,381	75,962	66,787	71,923	105,491	620,489	669,193	690,011	1,111,578	1,973,587
Manures :										
Basic Slag .. .. .. *Tons*	16,572	—	—	—	—	31,819	—	—	—	—
Bones for Manure (whether burnt or not) .. .. .. ,,	34,404	27,761	27,405	3,870	5,144	186,001	179,815	243,376	41,623	121,982
Guano .. .. ,,	39,285	26,720	21,645	2,601	—	252,086	182,005	218,714	27,675	—
Nitrate of Soda (Cubic Nitre).. ,,	171,910	131,520	20,896	1,190	300	1,721,138	1,498,068	361,619	19,500	6,000
Phosphate of Lime, and Rock Phosphate .. .. .. ,,	562,242	374,639	333,421	276,617	464,872	970,337	704,749	838,822	1,172,557	1,948,543
Unenumerated .. .. .. ,,	102,493	19,601	16,605	2,709	947	326,877	172,346	187,401	34,407	4,899
Metals and Ores and Manufactures thereof :										
Antimony Ore .. .. .. *Tons*	9,179	22,569	31,236	19,326	8,917	90,760	542,635	839,794	557,173	268,483
,, Crude and Regulus ,,	3,515	4,694	1,870	5,458	2,604	85,374	215,109	133,769	306,287	184,434
Brass, Bronze, and Metal Bronzed or Lacquered, Manufactures of :										
Wire .. .. *Tons*	888	3,058	1,105	832	325	71,637	301,098	183,374	166,762	59,333
Unenumerated .. .. ,,	2,340	41,206	18,768	12,740	3,999	246,412	4,361,417	2,787,856	2,024,677	737,249
Copper Ore .. .. .. ,,	71,573	37,774	34,309	16,554	15,319	837,867	812,309	1,010,827	713,998	841,992
,, Regulas and Precipitate ,,	42,543	38,286	43,839	28,238	21,013	1,500,504	1,759,395	2,860,627	2,065,594	1,764,331
,, Old, fit only to be remanufactured .. ,,	3,440	2,131	2,237	1,055	122	172,586	128,807	215,494	115,284	12,991
,, Unwrought, in Bars, Blocks, Slabs, Cakes and Ingots .. .. ,,	147,714	174,904	108,131	140,840	203,317	9,121,288	13,249,081	13,065,209	18,541,829	24,371,059
,, Part Wrought .. .. ,,	2,762	5,482	3,281	1,938	626	184,223	457,879	422,961	292,985	83,942
,, Manufactures, unenumerated .. .. ,,	10,267	6,398	1,582	1,559	1,708	831,022	612,646	237,160	325,729	258,101
Iron Ore :										
Manganiferous .. .. .. *Tons*	165,493	138,968	81,992	135,061	123,606	140,308	176,498	146,375	252,503	231,413
Other Sorts .. .. .. ,,	5,539,255	6,058,187	6,851,775	6,054,594	6,458,122	5,014,461	7,000,233	11,629,056	11,787,703	13,209,812
Iron and Steel, Old (except old Rails) .. .. ,,	110,097	113,263	97,857	23,570	5,572	332,575	367,870	360,635	98,167	24,388
Iron, Pig : Basic .. .. ,,	64,354	45,578	23,314	48,076	62,831	182,870	145,282	75,007	255,986	447,828
,, Forge and Foundry.. ,,	51,854	104,167	107,909	75,547	29,889	251,775	640,975	800,615	1,011,584	1,038,715
,, Hæmatite .. .. ,,	84,450	26,162	1,849	17,863	11,642	412,553	120,744	16,172	283,206	403,603
,, Spiegeleisen, Ferro-Manganese and Ferro Silicon .. ,,	22,708	18,488	24,422	13,640	24,992	149,387	219,333	525,847	520,652	1,182,095
Lead Ore .. .. .. ,,	28,436	14,062	11,443	8,657	1,502	287,489	162,626	150,592	151,720	25,447
,, Pig and Sheet .. .. ,,	224,916	255,977	158,373	147,124	207,932	4,232,623	5,617,504	4,881,403	4,508,426	6,822,935
Manganese Ore .. .. .. ,,	479,435	372,724	440,659	331,264	365,606	1,001,654	1,180,758	2,322,400	2,353,180	3,397,455
Platinum, Wrought or Unwrought .. .. *Ozs.Troy*	15,188	3,348	1,964	3,806	1,223	137,035	26,537	17,393	42,637	23,550
Pyrites of Iron and Copper .. *Tons*	803,149	903,467	949,996	854,241	836,703	1,320,114	1,567,784	2,213,091	2,338,026	2,713,408
Quicksilver .. .. .. *Lbs.*	2,832,626	3,043,434	2,556,214	2,173,434	1,077,460	270,633	547,228	560,339	499,160	279,280
Silver Ore (including the Value of the Silver contained in Argentiferous Ores and Metals) *Value*	—	—	—	—	—	888,642	689,297	706,999	887,227	632,726
Tin Ore .. .. *Tons*	32,398	44,748	33,912	41,208	32,330	2,981,473	3,777,711	3,159,622	4,710,934	5,144,432
,, In Blocks, Ingots, Bars, and Slabs .. .. .. ,,	40,961	38,896	33,646	27,143	12,567	6,359,145	6,304,546	6,149,490	6,198,243	4,056,225
Zinc Ore .. .. ,,	144,251	114,360	78,325	87,368	92,787	817,003	1,213,664	1,040,941	964,939	974,703
,, Crude, in Cakes .. .. ,,	115,859	74,522	53,327	76,105	64,138	2,749,807	3,979,781	3,853,263	4,157,840	3,293,494
,, Manufactures .. .. ,,	12,445	8,036	3,669	4,105	3,016	348,153	438,042	358,312	396,576	306,487
Ores, unenumerated .. .. ,,	262,562	180,464	228,911	195,184	213,923	805,273	1,210,873	2,042,402	2,502,965	3,457,041
Methylic Alcohol (not purified so as to be potable).. .. ..*Gallons*	497,243	652,348	627,292	339,757	316,891	53,264	76,050	103,456	86,675	173,182
Mica .. .. *Cwts.*	29,029	37,505	46,643	51,075	72,383	115,229	112,028	213,960	371,425	676,515
Nuts and Kernels : For expressing Oil therefrom :										
Copra .. .. *Tons*	66,494	118,540	62,400	52,400	7,930	1,684,869	2,918,644	1,959,583	2,229,596	365,072
Ground Nuts .. .. .. ,,	—	—	—	137,758	135,768	—	—	—	3,807,892	4,409,513
Palm Kernels .. .. .. ,,	74,797	233,249	241,501	248,160	295,334	1,411,928	3,909,269	5,253,569	6,300,733	7,717,194
Other Sorts .. .. .. ,,	27,556	96,448	69,121	9,218	4,379	498,620	1,202,543	1,318,880	278,416	204,774
Nuts and Kernels, Unenumerated (not being Drugs, Dyestuffs, or Fruit) .. .. .. *Value*	—	—	—	—	—	253,976	538,896	386,944	288,216	165,612

IMPORTS OF ARTICLES OF FOREIGN AND COLONIAL MERCHANDISE—*continued.*

(Articles subject to Duty on Importation are printed in *Italics* in the first column.)

ARTICLES.		QUANTITIES.					VALUE.				
		1914.	1915.	1916.	1917.	1918.	1914.	1915.	1916.	1917.	1918.
							£	£	£	£	£
Oil : Mineral Jelly (including Vaseline)	*Cwts.*	23,418	20,147	41,865	96,392	164,025	56,122	48,391	87,390	163,298	273,230
,, Olive : Unrefined	*Tuns*	5,577	4,737	5,374	2,522	1,645	266,563	224,827	272,272	168,081	244,065
,, ,, Refined	,,	6,388	6,213	5,180	2,179	2,970	396,849	382,763	344,307	205,348	602,200
,, Palm (not including Palm Kernel Oil) Unrefined	*Cwts.*	1,318,303	1,347,379	1,243,556	1,461,710	1,696,882	1,917,901	1,953,427	2,198,984	3,209,004	3,935,487
,, Palm Kernel Unrefined	,,	169,462	—	—	—	—	339,744	—	—	—	—
,, Palm and Palm Kernel Refined	,,	62,399	399	—	30	—	138,364	1,232	—	75	—
,, Petroleum :											
,, Crude	*Gallons*	15,105,588	3,860	1,855	280	—	154,930	109	53	6	—
,, Lamp Oils	,,	150,131,233	144,734,313	127,339,777	127,958,665	148,021,234	2,501,054	2,575,632	3,071,394	5,074,050	8,501,126
,, *Motor Spirit*	,,	119,030,155	144,574,891	161,410,824	139,270,181	192,959,054	4,301,865	5,249,497	9,974,293	11,024,001	18,426,782
,, Spirit, other than Motor Spirit	,,	—	—	—	—	—	—	—	—	—	—
Lubricating Oils	,,	66,646,512	76,792,165	83,167,754	87,779,737	102,273,841	2,340,982	2,902,022	5,295,113	7,147,980	10,839,880
Gas Oil	,,	83,105,346	90,139,007	57,074,508	31,303,820	38,835,460	977,194	1,084,866	1,064,824	1,213,446	2,180,590
Fuel Oil	,,	212,675,855	132,204,554	22,556,004	440,582,168	842,405,536	2,479,376	1,491,682	373,126	9,427,449	23,984,916
Other Sorts	,,	17,942	20,909	5,430	320	—	806	1,687	277	40	—
,, Seed :											
Castor	*Tons*	845	763	5,701	3,474	5,246	25,542	28,261	249,125	219,373	422,574
Cotton seed Oil : Unrefined	,,	3,114	4,086	712	209	1,912	89,851	106,504	28,574	9,363	119,228
,, ,, Refined	,,	19,866	33,771	10,098	8,537	17,264	659,475	1,115,973	516,227	739,841	1,902,995
Linseed Oil :											
Pure	,,	5,152	167	6	84	124	129,190	6,615	160	4,302	5,931
Not Pure	,,	104	—	3	5	—	2,442	—	75	220	—
Rape seed Oil	,,	6,861	8,284	7,989	2,151	207	198,162	250,443	307,233	120,585	13,145
Soya Bean Oil*	,,	—	—	—	3,502	596	—	—	—	196,572	28,830
Other seed Oils	,,	24,314	42,168	48,471	9,771	2,471	868,001	1,302,831	1,884,805	618,929	225,641
,, Turpentine	*Cwts.*	348,206	529,517	430,780	221,192	63,320	542,205	903,381	903,384	620,747	326,197
,, Essential :											
Natural	*Lbs.*	2,286,696	2,755,109	2,549,339	2,612,808	2,053,705	532,915	611,326	633,789	752,947	879,113
Artificial	,,	140,257	134,164	221,243	320,306	169,690	21,025	46,198	48,485	99,906	83,917
,, Unenumerated	*Value*	—	—	—	—	—	145,059	192,487	195,794	264,930	333,671
Oil-seed Cake, containing no dutiable ingredient :											
Cotton-seed Cake	*Tons*	183,169	217,464	191,995	131,898	2,719	1,083,478	1,614,462	2,017,790	2,092,801	45,623
Linseed Cake	,,	47,555	66,697	74,418	76,860	8,109	360,508	651,815	937,312	1,483,833	164,411
Rape-seed Cake	,,	37,421	7,755	734	616	—	184,092	47,623	7,141	9,216	—
Unenumerated	,,	61,286	133,197	16,850	3,518	—	360,761	959,259	153,704	52,294	—
Oleo-margarine or Oleo Oil, and Refined Tallow	*Cwts.*	363,676	645,767	650,584	626,405	1,488,099	793,533	1,628,557	2,086,489	2,940,209	7,745,735
Painters' Colours and Pigments :											
Barytes	,,	631,780	141,739	184,704	27,979	29,604	85,277	36,016	63,390	9,426	18,899
Nickel Oxide	,,	25,264	33,463	24,306	23,608	19,573	125,754	168,757	127,180	132,298	109,694
Red Lead	,,	39,621	2,111	12,592	2,315	—	42,667	2,886	29,186	5,430	—
White Lead	,,	282,642	174,502	160,209	51,718	4,610	337,591	233,380	314,079	112,256	9,479
Zinc Oxide	,,	354,708	379,247	275,902	201,625	79,786	409,543	575,147	661,873	603,788	240,117
Unenumerated	,,	729,713	490,710	568,647	319,653	186,468	668,227	499,270	924,513	859,206	518,300
Paper-making Materials :											
Pulp of Wood :											
Chemical, Dry, Bleached	,,	18,681	30,254	20,083	20,742	16,007	208,043	350,496	436,878	890,277	764,619
,, ,, Unbleached	,,	396,399	362,513	158,768	142,108	220,755	3,314,439	3,376,140	4,327,745	5,767,689	8,414,457
,, Wet	,,	18,159	10,074	19,914	8,350	773	63,896	33,838	368,836	194,456	9,817
Soap, not containing sweetening matter :											
Stock	*Cwts.*	75,309	28,967	6,118	894	885	58,612	20,752	5,546	2,060	1,199
Soft soap	,,	7,164	2,970	752	—	43	5,972	3,565	1,181	—	197
Household and Laundry Soap in bars or tablets	,,	106,948	181,233	83,156	4,112	576	130,658	226,614	114,342	9,795	1,494
Polishing and Scouring Soap	,,	3,770	3,892	2,184	—	—	4,862	4,343	2,651	—	—
Soap Powder	,,	49,387	56,526	25,100	30	16	48,210	54,845	23,673	60	112
Toilet Soap	,,	15,447	18,137	12,860	1,208	1,784	111,664	140,594	88,178	12,078	24,334
Soap, Transparent, in the manufacture of which Spirit has been used	*Lbs.*	20,982	12,789	3,220	2	—	715	387	91	—	—
Unenumerated (including Cotton seed Oil Soap)	*Cwts.*	175,487	174,261	103,465	8	—	109,994	122,858	124,110	43	—
Sugar :											
Unrefined : Beetroot	,,	4,857,218	2	—	36,294	153,836	2,531,628	—	—	42,041	185,510
,, *Cane and other sorts*	,,	17,125,785	19,537,498	22,459,388	24,324,493	25,528,146	13,973,519	19,092,483	24,908,544	30,278,860	33,412,289
Glucose, Solid	,,	311,578	348,187	325,748	259,048	208,038	156,899	216,758	287,471	422,535	656,329
,, *Liquid*	,,	898,923	1,062,091	922,872	703,901	169,583	443,893	665,485	862,133	1,407,583	598,908
Molasses and invert sugar :											
Containing 70 per cent. or more of sweetening matter	,,	86,278	105,695	39,339	56,412	31,099	28,419	46,735	30,062	137,573	100,598
Containing less than 70 per cent. and more than 50 per cent. of sweetening matter	,,	747,161	877,668	677,912	1,254,533	690,278	212,488	309,336	493,171	2,176,249	1,484,463
Containing not more than 50 per cent. of sweetening matter	,,	61,770	48,660	7,273	41,635	24,274	12,960	13,265	2,588	32,933	33,552
Molasses for Distillers' use in the Manufacture of Spirits, and for Food for Stock	,,	2,481,837	1,863,430	1,691,470	1,431,773	566,280	396,624	328,646	422,891	671,815	408,807
Saccharin and mixtures containing Saccharin, or other substances of like nature or use	*Ozs.*	1,656,714	2,124,183	356,354	551,636	2,321,937	22,438	64,767	25,251	173,573	877,560
Talc, French Chalk, Steatite, Mineral White, Silica and Soapstone	*Cwts.*	239,489	282,030	303,394	255,698	303,652	48,839	66,662	83,102	77,469	144,022
Tallow (including vegetable Tallow) Unrefined	,,	1,641,852	1,636,981	940,924	610,299	402,814	2,662,228	2,786,485	2,120,359	1,810,560	1,446,817
Tar (other than Coal Tar)	,,	253,768	249,319	115,641	146,709	64,972	90,524	117,672	99,854	263,919	154,000

* Included in "Oil Seed : Other Seed Oils," prior to 1917.

The Dyestuffs Licensing System

British Chemical Trade Association and the Board of Trade

We have received from the British Chemical Trade Association the following correspondence, which has passed between the Association and the Board of Trade, relating to the constitution of the Dyestuffs Licensing Sub-Committee and the Association's claim to representation on it. In forwarding the correspondence the Secretary writes:—"I am instructed by my Committee to forward you the enclosed copies of correspondence exchanged between the Board of Trade, Industries and Manufactures Department, and this Association. The matter dealt with is one of vital interest to the Trade, and you may therefore like to publish the correspondence in your valued paper."

Dyestuffs Licensing Sub-Committee

80, Fenchurch Street, E.C. 3,
July 29, 1919.

Sir,—In view of the fact that this Association represents, by its membership, every branch of the chemical trade, including merchants, manufacturers, exporters, importers, agents and consumers, and as so many of our members are interested in the trade in dyestuffs, I beg to apply, on behalf of the General Committee, for representation on the above-mentioned Committee. It is felt that although the Licensing Sub-Committee, as at present constituted, represents the dye manufacturers and to some extent the consuming interests, the important merchant interests are so far given no opportunity at all of putting forward their side of the case. A reply at your early convenience will be appreciated.—Yours faithfully,

The British Chemical Trade Association,
S. J. C. Mason, *Secretary*.

W. Graham, Esq.,
Offices of the Dye Commission,
Board of Trade, 7, Whitehall Gardens, S.W. 1.

Board of Trade,
Industries and Manufactures Department,
Gwydyr House, Whitehall, London, S.W. 1,
August 8, 1919.

Sir,—With reference to your letter of the 29th July, regarding representation of your Association on the Dye Trade and Licensing Sub-Committee, I am directed by the Board of Trade to state that the constitution of the Committee was settled, after careful consideration, when the Government scheme for affording State assistance to the dye industry, outlined in White Paper Cd. 9194, was prepared; and they regret that in the circumstances it is impossible for them to add to the membership of the Committee in question.—I am, &c.,

Percy Ashley.

The Secretary,
The British Chemical Trade Association.

August 9, 1919.

Sir,—In reply to your favour of August 8, it is respectfully submitted that in the first place the manufacturers represented on the Licensing Sub-Committee are not in a position to deal with the entire dyestuffs requirements of this country; and secondly, that the consuming interests represented, though presumably the largest individual consumers, do not represent the bulk of the consuming trade. It would appear, therefore, to be more fair, more satisfactory to the trade generally, and more calculated to allay any public distrust if an Association such as this, representing manufacturers outside British Dyes, Limited, dye-importing interests and consuming interests outside Messrs. Bradford Dyers' Association and Messrs. The Calico Printers' Association, were to be represented on the Committee. Further, it is presumed that it is within the discretion of the Board of Trade, even at this date, to rectify the omission of a step which might have been thought advisable at the initiation of the scheme. It is therefore requested that you would be good enough to reconsider your decision in your letter of August 8.—Yours faithfully,

The British Chemical Trade Association,
S. J. C. Mason, *Secretary*.

The Assistant Secretary,
Board of Trade, Industries and Manufactures Department.

August 22, 1919.

Sir,—I thank you for the interview accorded to our Mr. Bromfield on August 14. It is understood that the following summarises your statements at the interview in question:—

1. That no definite policy has yet been formulated by the Government as to the disposal of the German dyes which it is understood are being taken by the country on account of the indemnity, but that if any firm is appointed as sole distributing agents on behalf of the Government, such firm will not be allowed to sell to one firm and refuse supplies to another at their discretion. That the Government will take the opinion of various bodies before making any decision, and that this Association is invited to offer its assistance in the matter.

2. That as regards our application for representation on the Licensing Sub-Committee, manufacturers and consumers are already represented, but merchants are not. You consider the present Committee well balanced and adequate, but you invite this Association to submit a definite statement as to the points in the present scheme upon which we disagree, giving our reasons, together with any suggestions we wish to make, and also a statement as to why we consider merchants' interests should be represented on the Committee. Further, that any representations we may make would be submitted to the President of the Board of Trade and would be carefully considered.

3. That you expressly point out that the Board of Trade does not decline to recognise this Association, but on the contrary this Association is recognised by the Government as representative of the merchanting interests.

To deal with the above points *seriatim*:—

1. We are glad to note that if a trading firm is appointed as sole distributing agents for the German dyes referred to, they will not be allowed to supply to one concern and refuse another at their discretion. We should like to be assured also that the Government will not instruct any such firm to deal with the dyes in question on anything but an open market basis. I would like to insert here certain general observations which have a bearing on this matter:—

The policy of this Association, from its inception, has been to foster and protect the trade and interests of the British manufacturer and the British consumer. At the same time, we oppose the principle of granting special concessions to any particular manufacturer or consumer or any particular group of manufacturers or consumers. It is generally assumed to be of the highest importance, particularly at the present juncture, that the export trade of the country should be fostered. Dyes are exported and re-exported partly in their original (or reduced) form, and partly as an item in the finished product of dyed or printed goods, &c. It is estimated that between 50 per cent. and 60 per cent. of the dyes imported into this country before the war were re-exported in the form of finished goods.

The question of re-exportation of dyes in the original form has also to be considered. It is submitted that if a proportion of the German dyes which are allocated to this country can be sold for re-export at attractive prices, this re-exportation should be allowed, with a view to retaining the British merchants' connection abroad in the meantime, and eventually supplying such connections with British dyes, which it is hoped will be on the market and available for export by the time the stocks of German dyes are exhausted.

A great deal of prejudice and considerable opposition has arisen during the last five years to a class of so-called merchants who have sprung up, and either by speculation or re-handling goods, simply served to increase prices to the consumer. The Association is also opposed to this class, but it is submitted that the *bona-fide* and legitimate merchant is a useful factor, as, by his special organisation and trade knowledge, he acts as a financier, a distributor, and an exporter, more efficiently than is possible to a manufacturer. This point can be amplified, and detailed statements of facts can be produced if desired, but you will probably be prepared to accept the hypothesis without further remark.

It is therefore submitted :—

That the German dyes in question should be sold on an absolutely open market, that is to say, that the firms who are willing to pay the best prices should receive the goods, whether such firms are consumers, merchants or exporters.

That the dyes should be put on the market in comparatively small lots, in order to give the small consumer an equal chance with the large and financially powerful organisations to secure supplies. We deprecate anything in the nature of favouritism or opportunity to "corner."

That the distribution should not be effected by any particular or individual firm, whether camouflaged by an official title or not. There is strong opposition to the so-called "Central Importing Agency" already established. The information which must necessarily accrue to any individual concern acting in such a capacity may be applied at a later date or indirectly for individual advantage. I would mention here that the Association has received various protests on this point, and quite apart from the merchants' point of view, it is submitted that the present system is frequently exceedingly unsatisfactory to the consumer. Many consumers are averse to letting the "Central Importing Agency" know exactly what dyes they are using, because naturally every manufacturer has some particular method of working, which he will not under any circumstances risk getting into the hands of possible competitors. It would be preferable for the distribution of the German dyes to be undertaken either by a Government Department with expert whole-time assistants on the trade and technical sides, or if this suggestion is unacceptable on the ground of expense or reluctance to increase the scope of official action, it is suggested that this Association, representing merchants generally, and not any individual, should undertake the distribution for the Government, possibly somewhat on the lines of the United Kingdom Oil and Oil-Seed Brokers' Association. Further, if this suggestion were in principle considered acceptable, I think it could be arranged for the Association to undertake the work on a basis of actual out-of-pocket expenses only, and a guarantee that such expenses should not exceed a certain specified percentage. (This Association, under its Memorandum and Articles of Association, is expressly precluded from trading or making any profit.)

2. We contend that the present Import Licensing Committee, and also the Licensing Sub-Committee, are ill-balanced and unsatisfactory for the following reasons :—

Manufacturing interests are not fairly represented. It is true that the Dye Manufacturers' Section of the Association of British Chemical Manufacturers is represented on the Committee, and therefore presumably had a voice in nominating the Licensing Sub-Committee, but the smaller and independent dye manufacturers are not really represented at all, in so far as even if they are members of the Association of British Chemical Manufacturers, they have, under the constitution of that Association, no real voice in its management, and are entirely controlled and out-voted by the larger subscriptions paid, *e.g.*, by Messrs. British Dyes, Ltd., and Messrs. Levinstein's. The consumers' interests are not fairly represented simply by Messrs. Bradford Dyers' Association and the Calico Printers' Association; because, it is submitted, these two organisations, though admittedly the two largest individual consumers in the country, do not take between them 50 per cent. of the national dye consumption. The merchant interests are not represented at all. The whole Committee is constituted to deal with a question of importing, and importing is the business of a merchant, not a consumer. The consumer, generally speaking, wants stuff delivered on his doorstep in comparatively small quantities, and usually locks his capital up in manufacturing interests and book debts, and only wants to pay for supplies of raw material on or after delivery. The function of the merchant is to buy in quantity and finance in the country of origin of the imported merchandise, to arrange rapid and economical transport, and to deliver the goods on arrival in smaller quantities to suit the consumer. Before the war at least 95 per cent. of the imports of dyes was made by merchants or agents.

It is recognised by the Board of Trade, and admitted in their White Paper No. Cd. 9194, that certain dyes which are required in this country are not manufactured here. Whilst recognising the importance of fostering home production, it is submitted that it is nationally and financially unsound to prevent the importation of raw material which is either unavailable here or which cannot be produced to compete within a reasonable margin with the price at which the product of an allied nation can be delivered here without any principle of dumping being involved. It is suggested that it is in principle unfair to govern the business of the importing merchant, who is at least equally involved with the consumer, through a Committee composed exclusively of representatives of firms whose interests lie (as far as manufacturers are concerned) in preventing imports as far as possible, or (as far as consumers represented are concerned) in hindering imports by outside and competitive firms. It is submitted that such Licensing Committee should be as widely representative as possible, and that all parties interested should be given an opportunity of submitting their point of view.

It is therefore again requested that this Association may be allowed to nominate a representative or representatives to the Dyestuff Licensing Sub-Committee. Our objections to the present "Central Importing Agency" are outlined above, but these can be amplified if you so desire.—I am, &c.,

THE BRITISH CHEMICAL TRADE ASSOCIATION,
S. J. C. Mason, *Secretary.*

Percy Ashley, Esq., C.B.,
Board of Trade, Industries and Manufactures Department.

Board of Trade,
Industries and Manufactures Department,
Gwydyr House, Whitehall, London, S.W. 1,
August 28, 1919.

SIR,—I am directed by the Board of Trade to acknowledge the receipt of your letter of the 22nd August, and to say that your representations with regard to the importation of dyestuffs into the United Kingdom will be borne in mind in connection with the arrangements for the distribution of any supplies of dyestuffs which may be obtained from Germany under the Peace Treaty. I am, however, to add that, as already pointed out, the Board cannot see their way to increase the representation on the Licensing Sub-Committee of the Trade and Licensing Committee. —I am, &c.,

A. W. FLUX.

The Secretary,
The British Chemical Trade Association.

Fuel Economy in Steel Works

The Need for Co-operative Research

AT the annual meeting of the Iron and Steel Institute a paper prepared by Professor W. A. Bone, Sir Robert Hadfield, and Mr. Alfred Hutchinson was presented, on "Fuel Economy and Consumptions in the Manufacture of Iron and Steel."

The main point in the report was that the achievement of the utmost fuel economy in a modern iron and steel works is essentially a matter of the scientific organisation and disposition of the plant as a whole, with a view to utilising to the best advantage, in the steelworks and rolling-mills, the energy in the surplus blast-furnace and coke-oven gases.

The possibility of attaining such an ideal is primarily due to three great technical developments which have been made since 1880, namely :—

(1) In the manufacture of metallurgical coke in chamber ovens with heat recuperation and by-product recovery, which have mainly been due to the efforts of Continental (Belgian and German) chemists and engineers;

(2) In the generation of power in internal combustion engines from cleaned blast-furnace gas, the practical possibility of which was first demonstrated by the late Mr. B. H. Thwaites in 1894-5, and afterwards realised on a large scale by Messrs. Bailly and Krafft, under the leadership of the late Mr. Adolph Greiner, at the Seraing works of the Société Cockerill in Belgium; and

(3) In methods of cleaning blast furnace gas (*a*) by water-washing, as in the Thiessen apparatus, or, preferably, (*b*) by electrostatic methods, which have recently been developed in this country.

The economy in fuel which would result from the concentration of by-product coke-ovens, blast-furnaces, rolling-mills, and steelworks on one site, coupled with the utilisation of the com-

bined surpluses of coke-oven and cleaned blast-furnace gases, partly in large internal combustion engines driving dynamos generating electricity for operating the rolling-mills and all other machinery on the plant, and partly also to displace producer-gas in the steel furnaces and soaking pits, had become manifest during the early years of the present century, largely as the result of Continental experience (*i.e.*, in Belgium, Germany, and Austria).

The paper pointed out that the British iron and steel industry has, in this respect, laboured under a disadvantage as compared with its Continental rivals. For whereas most of our smelting plants and ironworks were established before 1880, the modern German industry arose after that period, when it was manifestly the right policy to organise and lay out iron and steel plants with the express purpose of securing all the advantages latent in such a concentration of units as has been indicated. Here, it must be admitted, the German genius for organisation, and for the logical working out of a policy based on ascertained scientific principles, had ample opportunity, which it did not fail to turn to the best advantage. Accordingly it was not surprising to find, during the decade preceding the war, that whilst the newer German iron and steel works embodied, in a marked degree, the advantages of concentration and co-ordination of units, under scientific control, the older British plants had to be gradually remodelled, as circumstances permitted, so as to conform, as nearly as possible, to the new conditions. It is therefore not necessarily disparaging to British enterprise to have to admit that, since the opening of the present century, the Continental industry has probably secured a lead in regard to fuel economy, because of its comparative newness and superior organisation. At the same time, some of our British undertakings had also shown commendable enterprise in this direction.

Results of Experiments

A considerable number of experiments in blast furnaces were carried out, from which were obtained as nearly as possible the following average figures for coke consumptions in the furnace per ton of iron produced, and their coal equivalents :—

		Cleveland.	Lincolnshire.	Midlands Basic.	Hæmatite.
Number of plants averaged	..	7	4	4	6
Average coke consumption.	Cwt.	23.5	33.0	26.0	21.33
Average coal equivalents.	,,	32.65	47.0	37.0	30.0

The general impression conveyed by the results as a whole is that, in most cases, there are considerable margins for economising fuel on British blast-furnace plants, chiefly in the direction of (*a*) reducing losses at the bells, (*b*) improving the utilisation of that portion of the gas which is used for heating the blast, (*c*) substituting gas-driven for steam-driven blast engines, (*d*) utilising the heat carried away in the molten slag, and (*e*) instituting a more systematic fuel control throughout the plant as a whole.

With respect to open-hearth steelworks fuel consumption, experiments were carried out in molten pig processes, mixed processes, and cold processes. The coal consumptions at the open-hearth furnaces proved to be least with the molten pig and greatest with the cold processes :—

	Cwt. per ton of Ingots.	Average. Cwt.
(*a*) Molten pig processes ..	6.00 to 7.00	6.35
(*b*) Mixed processes ..	6.25 ,, 8.75	7.65
(*c*) Cold processes	7.00 ,, 12.00	9.45

Two firms made returns as to the Bessemer process, and two respecting the coke used in melting steel in their crucible furnaces. One of the latter reported a coke consumption of 2 tons 15 cwt., and the other of 3 tons 7½ cwt., for the melting operation only. Both firms reported adversely regarding the substitution of by-product for beehive coke in their crucible furnaces.

General Conclusions

The results, as a whole, prove beyond all question that much yet remains to be done before British iron and steel works will have attained to anything like the practical ideal of fuel economy which at least three leading iron and steel makers have declared to be even now attainable. None of the returns show that, even where coke-ovens, blast-furnaces, steelworks, and rolling-mills are concentrated on one site and under one management, the manufacture of the steel and its subsequent rolling into finished sections have as yet been accomplished with no other expenditure of coal than that which must be charged into the coke-ovens to make the coke required for the blast-furnace. In his memorandum to the Coal Conservation Committee in October, 1917, Mr. Benjamin Talbot estimated that a ton of finished steel sections could then be produced with no greater expenditure of fuel than 35 cwt. of coal at the coke-ovens. According to our analysis of the returns of the four firms using "the molten pig process," none of them are using less than 40 cwt. of coal per ton of finished steel sections, and two were using about 50 to 55 cwt.

There are so many directions in which further large economies may be effected, even when the necessary concentration and co-ordination of plant units have been secured, that we cannot hope to do more than indicate a few of the more obvious of them. The surplus blast-furnace and coke-oven gases can undoubtedly be much better and more fully utilised than they are to-day on most plants. The data published in this report concerning the temperatures and compositions of waste gases from boilers, stoves, furnaces, and soaking-pits, show that the science of combustion is, as a rule, either imperfectly understood or very badly applied by those in charge of the plants. A great deal of heat can, and ought to be, recovered from such waste gases.

Such satisfactory progress is now being made with the electrostatic cleaning of blast-furnace gases that the day may be confidently anticipated when all the gas (whether required for stoves or engines) will be so cleaned. This will undoubtedly increase the thermal efficiency of the hot-blast stoves, and make a larger surplus of gas available for the steelworks.

Speaking of the utilisation of the surplus gas for power purposes, it seems a barbarous practice to burn uncleaned blast-furnace gas in Lancashire boilers, whose efficiency probably does not exceed 55 per cent., when (if cleaned) its potential energy can be transferred into electric power *via* the gas-engine and dynamo. The day is fast approaching when, in steelworks adjacent to blast-furnaces, all stationary machines (including blowing-engines, cranes, and rolling-mills) will be electrically driven by current generated from the explosion of blast-furnace gas in internal combustion engines. Even now, steam-driven reciprocating blowing-engines should be superseded by electrically driven turbo-blowers.

When such reforms have been carried out in connection with the blast-furnace plants, we may look for the abolition of the "gas-producer" in the adjacent steelworks, a step much to be desired. The blast-furnace is the place where all the coal on an iron or steel plant should be gasified after it has been carbonised in the coke-ovens.

The problem of recovery and utilising the heat carried away in the molten slag from the blast-furnace is one which ought to be solved in the near future.

We would again emphasise the view that the problem of fuel economy, as it presents itself to-day, is one rather of scientific organisation and co-ordination than of the discovery of new principles. In all the larger works there ought to be an organised staff wholly engaged, under competent direction, in controlling the fuel consumption. Such control ought not to be relegated to a member of the technical staff, whose chief attention must be given to the supervision of machines or of operations in which the consumption of fuel is merely an incidental, and perhaps even subordinate, consideration. It should be borne in mind that our scientific knowledge regarding fuels and their combustion has developed so rapidly during the past twenty years that it has now become a separate branch of technology for which special training is required. Without such training the ordinary works chemist (and still more so the engineer) is not competent to handle the subject. The task of training a sufficient number of competent men is one that will tax to the utmost the resources of the various laboratories established within recent years for the special study of fuel technology at our Universities, and the Government should be urged, as a matter of pressing and vital importance, to assist, by adequate financial support, the extension of such educational facilities. A great deal might also be accomplished by some co-operative or collective effort on the part of a group of works in one and the same neighbourhood. Such group of firms might well unite in establishing, for their joint benefit, a common fuel laboratory and staff. The increasing cost of coal, and the present serious fuel situation, will probably compel action along some such lines.

The full accomplishment of all (or indeed any of) these reforms will demand much co-operative investigation and action throughout the whole industry. But the fuel situation has now become so serious in this country that the industry ought to cast aside sectional or individual interests or jealousies in a mighty and patriotic concerted effort to achieve the utmost efficiency and

economy in its use of coal. It is a duty that it owes both to the present generation and to posterity. The British Association Fuel Economy Committee, on whose behalf and in whose name we speak, will feel that its work has not been in vain if, as the result of their reading and discussing this Report, the leaders of the iron and steel industry inaugurate a movement that will not end until the "practical ideals" set before them in it have been achieved.

In the course of the discussion Mr. C. Tannyson spoke of the scheme now being developed by the Federation of British Industries for the practical application of good methods of fuel economy. The scheme aimed at doing for all industries what Professor Bone proposed for the steel industry. It would set up an expert department under the control of a committee representative of all the industries, and the work would be under three heads—investigation of the sources of supply of fuel; investigation of fuel practice in all trades; and the training of experts.

British Portland Cement

Reasons for Current High Prices

At the eighth ordinary general meeting of the shareholders of the British Portland Cement Manufacturers, Ltd., which was held on Monday at Winchester House, Old Broad Street, London, the chairman (Brigadier-General the Hon. F. C. Stanley) referred to the price of cement and gave an explanation, which he hoped would satisfy the buyer, that, high as the price is, it is not higher than manufacturing and trading conditions warrant.

Effect on Prices of Dearer Coal

The average annual profits realised by this company since the beginning of the war (he said) have been actually less than the profits of the pre-war years, and this fact should dispose of any question of this company making unduly high profits. Labour, fuel, and repairs are the principal items in the prime cost of manufacturing cement, and the aggregate of these three items has far more than doubled as compared with their cost in 1914. Every ton of cement requires approximately half-a-ton of fuel for its manufacture, so that when coal was advanced 6s. per ton, that advance automatically increased the cost of manufacturing cement by 3s. per ton—indeed, more than 3s. per ton, because we are not obtaining such suitable fuels as in pre-war days, and consequently the consumption has increased. Obviously more low-grade fuel is required to produce a ton of cement than of the better class fuel we were in the habit of using before the war. The use of it in the kilns is far from satisfactory, resulting in constant stoppages, with a consequent increase in the cost of production and a reduction in the quantity of cement produced. If the average price which we receive for our cement is doubled, the cost of manufacture is more than doubled, and the only hope one can see of any real improvement lies in the direction of increased production. Our standing charges, including head office and selling expenses, depreciation, and the fixed annual charge for our debenture interest, remain practically the same whatever quantities are manufactured, and if we can only get up to our pre-war quantities then these charges would be very materially reduced per ton.

As manufacturers it is our desire to supply the consumer with cement at the lowest price compatible with a fair return to our shareholders. We fully realise that the cheapening of its cost will increase its uses. Unfortunately, the attaining of this result does not depend entirely on our own efforts—it is subject to our obtaining a regular supply of fuel and materials for the maintenance of our plants at reasonable prices and, above all, on a sufficient supply of labour and transport. We are still seriously short of labour for certain grades of work, and the shortage of railway wagons is causing the gravest anxiety. At our inland works our orders are many thousands of tons in arrears owing to this cause. We are even on the point of having to close down certain works through full stores, despite a full order book. I would ask our many customers who are disappointed owing to these serious delays in delivery to realise they are due to causes beyond our control. Our urgent representations to the railway companies are in some cases wholly without effect, and it is impossible to exaggerate the seriousness of the position. We are already, whenever possible, shipping cement coastwise for redistribution by rail from centres where we have ascertained there is a better supply of railway wagons. Unless the New Ministry of Transport promptly handles this matter, which is one of the causes of high prices, industries which are getting into stride will become paralysed.

I am glad to say that the formation of a Whitley Council for the cement trade is well advanced, the Ministry of Labour, the Cement Makers' Federation, and the chief unions involved co-operating for this purpose. We all welcome the improved organisation of labour and are confident that the better opportunities now afforded for exchange of views will lead to a more complete understanding and easier solution of the difficulties both of employers and employees. We recognise that the workers' pre-war standard of comfort and conditions of living needed improvement, and we agreed, in conjunction with the rest of the trade, in March last to a forty-eight hours working week and the granting of a full week's holiday, with full pay, to all employees of a year's standing, and a week's holiday, with pay at a lower rate, even to those who have been with us for six months only. It is, however, essential that we should now settle down and all work to obtain that increased production which is needed to put our industry on a sound basis, and, indeed, to ensure that national prosperity which is so essential to our recovery from the ravages of war. I do not think any further shortening of hours in the cement industry practicable under present conditions, and in saying this I am not unmindful of the necessity for employers maintaining a wide outlook and sympathetic attitude towards the improved conditions which labour is entitled to and to an increased share in its prosperity, which can only be obtained by increased production.

Closer Working with the Associated Company

Alluding to the important matter of the closer working of the company with the Associated Company, he said:—As you are well aware, the Associated Company was instrumental in forming this company, in which it holds a controlling interest. At the outset a working agreement between the two companies was entered into, and the close association of the two companies was further ensured by the fact that certain of the Associated directors and managing directors served in similar capacities on the board of the British company. Necessarily, under these conditions the management of both concerns has always been close, but for some time past it has been felt that a still closer fusion would be desirable, and it has been considered that this could best be effected by a scheme of complete joint management, carrying with it a reduction in numbers, which, as you know, have always been rather considerable. As a result of the reduction in numbers making closer joint working possible, I am convinced that the efficiency of the management will be increased.

Regarding our future developments, we are considering, in conjunction with the Associated Company, a scheme for the establishment of cement works in India on a site which has been selected by Mr. Herbert Brooks, who is devoting his time to this project. It is considered that this is likely to prove a very remunerative undertaking, but the details are not sufficiently advanced to give you fuller information on this occasion.

Magadi Soda Co.

Mechanical Production to Reduce Cost of Labour

At the eighth ordinary general meeting of the shareholders of the Magadi Soda Co., Ltd., held on Monday at Winchester House, Old Broad Street, London, the chairman, Mr. Samuel Samuel, M.P., reviewed the position of the Company in reference to the production of soda ash.

Referring to the accounts he said it would appear that there had been a trading loss of £48,954, but this was not the actual condition, as a large proportion was expended on labour which would not recur. The sales which the company made were, unfortunately, much smaller than had been anticipated. The loan at the end of the year had increased from £50,000 to £112,000, this amount being advanced by various shareholders pending the increase of capital, which the directors had already announced to the shareholders would be necessary to complete facilities for carrying on the business on a sound commercial basis.

The stock in hand on December 31 last amounted to £53,175 8s. 6d., as against £10,965 for the year before. This stock, he said, would all have been disposed of at a remunerative price had the war conditions continued. But in consequence of the Armistice and the release of the soda ash the buyers preferred

to pay a higher price to taking the new article, especially in view of the fact that the purity of our practically raw soda is so fine that the authorities insist upon levying a higher duty for our raw soda, especially in India, Japan, &c., than they levy upon the soda ash, which is a manufactured article, whilst ours can be designated "raw" material. When we are producing the soda ash by further processes, which are necessary, you will be surprised to hear that we shall be able to enter the markets of India and other places at a lower rate of duty.

The Position in East Africa

As to the construction of the works in East Africa, I told you last year that one of the essentials for working the soda was a plentiful supply of pure clean water and that for the temporary work we had enough. We now have a plentiful supply of water for all purposes, owing largely to the manager, Mr. Lawley, whom we sent out last year. He has succeeded in locating considerable supplies and conducting them to our works. We have had a great many disappointments in the way of breakdowns when the machinery was tested, and this has caused us a very considerable loss. We have had some of the best experts advising us, and we feel confident that we shall not be long before all difficulties are overcome.

We have discontinued the production of soda by manual labour, owing to the enormous increase in the cost, and are doing everything we can to expedite the delivery and shipment of the necessary material, so as to convert the whole operation to a mechanical production and reduce the employment of labour to a minimum. We are satisfied, from the experiments that have been made by our chemists, that the article we shall produce will be equal, if not superior, to any that is on the market. We do not see any prospect of producing the soda ash during the current year of 1919, but we believe we shall have the whole of our works completed and producing by the spring of next year. I referred to the quality of our granular soda, which is virtually the crude soda ground rather coarse, and you will gather from what I said that we have been unable to market this material in competition with the soda ash; not that it is an unmerchantable article, but, naturally, our competitors compare it with a refined article which they produce, and point out especially the difference in colour, and the Customs in India and other places give to soda ash a preferential duty, so that, in consequence of these disadvantages, we have accumulated a large stock of granular soda, which we probably shall have to keep until we can refine it. But we have no anxiety whatever about being able to dispose of it in another form.

We have entered into certain contracts in various markets which we believe will at least give us a sufficient trade to pay our expenses. We shall be able to sell our soda ash and other products at a price that will defy competition as soon as all our mechanical appliances are in working order, and we are therefore satisfied that the contracts we have made will give satisfactory results to our buyers against no matter what competition they are faced with as well as to our company. We, of course, shall have in the immediate future to wait patiently for the completion of our works, having decided to stop everything else until this most essential condition has been reached. The production and sale of granular soda was undertaken as a temporary measure, and if it did not prove the success we expected, at any rate, it was an attempt to earn money for the company at as early a date as possible, notwithstanding the chaotic effect of the war. I am not going to give you any details either of the countries to which we have sold or the quantities or the price, because it would be against the interests of the company to do so. So far as the United Kingdom is concerned, we shall certainly be shipping soda ash here, and we shall also be producing the various products so as to be able to choose the battle-ground for any attacks that may be made upon our customers in various parts of the world by the monopoly at present in existence.

A SECOND EXPLOSION has occurred at the British Cellulose Works at Spondon. Four men were engaged on Tuesday morning in examining some distilling plant, which had been dismantled, when an explosion took place. Mr. W. Demedney, an engineer, of Derby, was instantly killed, and Mr. C. D. Walton, a chemist, was taken to the Derbyshire Royal Infirmary as the result of injuries received. The cause of the explosion is unknown as the plant was dismantled and not in operation.

Sheepbridge Coal & Iron Co.

British Industry Handicapped by Strikes

AT the annual meeting of the Sheepbridge Coal and Iron Co., Ltd., at Sheffield on Wednesday, a final dividend was declared of 5 per cent., making a total of 10 per cent., free of income tax, for the year, and the remuneration of the directors was fixed at £2,000 a year, free of income tax.

Lord Aberconway (chairman) in referring to labour troubles in this country, said that all intelligent men must see that strikes could only injure the country, decrease its means of production, and therefore play into the hands of the United States and of Germany, who were evidently prepared to take this country's trade from neutral countries, and who—at all events, so far as America was concerned—were in a position to do so. America had enormous capital resources, and Germany had a great industrial, hard-working population, and if this country did not get to work and abandon these trade disputes and really do justice to its own resources, it would be found that the working classes, and the poorer classes in particular, of this country would suffer terribly in the near future. The output of the men showed a decrease, and he was sorry to say that the percentage of absentees was much larger than in 1914, and slightly larger than in 1918. They were entitled to expect a larger output per man, but the total from the Sheepbridge and the subsidiary collieries exceeded two million tons. In the report reference was made to the Firbeck and Finningley collieries development, and he might say with regard to these, and in a lesser degree with regard to the Glapwell sinking, that the directors were quite unable to see their way to proceed with these works at the present moment. With regard to the output of ironstone, a decrease was shown at Cottesmore, Frodingham, and Desborough. They had taken a lease of more iron ore at Rexby in Lincolnshire, where there was good ore for making basic iron, which had been a most profitable part of their iron manufacture during the last twelve months, and he believed that that promised well. There was a very large demand for Midland ores. The South Wales people were taking great quantities, and he thought that the ironstone fields the company held were a very good asset. The output had been smaller owing to the labour difficulties and men being at the war. The Royston Grange limestone quarry in Derbyshire also promised well, but there again there had been decreased output owing to scarcity of men. With regard to pig-iron, a decrease had also to be reported, which was really due to the principal and most profitable furnace having blown out. They were, however, hoping to develop that part of their undertaking considerably by the erection of new modern blast-furnaces now in progress. There would be a gas-cleaning plant in connection with that work on the electrostatic principle, and he thought that the outlook so far as the blast furnaces were concerned was not at all a bad one. With regard to the rolling mills, they had had a small decrease due to the introduction of the eight-hour shift in place of the twelve-hour shift at the beginning of this year. The foundries also showed a small decrease, due to the cessation of orders from the Ministry of Munitions. The company had been making a large quantity of shell, and they had now turned the munition-making plant into ordinary fitting shops for ordinary castings, thus enabling them to take up a new class of work, and he hoped it would be a profitable class of work in the end.

There had been an increase of wages of the iron workers, and, so far as the blast furnaces went, they had increased wages 60 per cent. on the basis, bringing the total increase on the basis to 151 per cent. In the rolling mills they had increased wages this year equivalent to 58 per cent. on the basis, making a total increase of 173 per cent. With regard to coal, the working costs had increased enormously. The total advances were now equivalent to 120 per cent. on the 1911 basis and 180 on the 1888 basis. Instancing some of the increased costs of stores, he said that the cost of timber had increased by 460 per cent., bolts and nuts by 350 per cent., oils by 250 per cent., and wire ropes by 260 per cent.

ACCORDING TO *Stubb's Weekly Gazette*, the failures in the United Kingdom for the week ended September 20 were 16, an increase of three. The number of bills of sale registered and re-registered was 94, an increase of 51. Mortgages and charges registered by limited companies amounted to £3,397,758, the amount authorised (where stated) being £280,000.

Institute of Metals

New Industries at Sheffield

THE first post-war Conference of the Institute of Metals was opened at Sheffield on Wednesday and continued on Thursday. In connection with the Conference an exhibition was arranged of British manufactures started to replace those of Germany and Austria. Some of these new developments are distinctly promising. Permanent magnets, for example, have been a Sheffield industry only since 1912, but war-time progress has made Britain independent of foreign supplies; the Sheffield pioneers show sixty different varieties. Carbon electrodes for electric furnaces are another essential which we imported from Germany, and Sheffield has the first British factory solely equipped for making them. One Sheffield firm has made millions of aluminium spoons and forks since 1915, up to which date the manufacture was a German monopoly.

The following was among the papers read on Wednesday:—

The Micro-mechanism of the Ageing of Duralumin

By Zay Jeffries, D.Sc.

The author agreed with the conclusions of Mercia, Waltenberg, and Scott that there is a certain average size of precipitated $CuAl_2$ particle which produces maximum strength and hardness in duralumin; that when the size of particle is less than this particular size, or larger than this size, the hardness decreases; and that, notwithstanding the abundant evidence with other non-allotropic metals, maximum dispersion produces maximum hardness, even to atomic dispersion—that is, solid solution. Why does duralumin present this apparent discrepancy? The author offered the following observations:—

When a molecule of $CuAl_2$ is removed from the solvent, or matrix, and added to another group of $CuAl_2$ molecules, as is known to occur on slow cooling, the forces of adhesion between the $CuAl_2$ molecule and the solvent have been exceeded. Since a change in temperature only is sufficient to cause precipitation, it must also be sufficient to cause the loss of adhesion bonds between the excess $CuAl_2$ molecules and the solvent, or matrix. Lost adhesion bonds means loss of cohesion of the mass as a whole.

When duralumin is cooled from 500° in a furnace, globules of $CuAl_2$, large enough to be seen easily with a high-power microscope, are formed. In the same sample, however, some globules are so small as to be hardly distinguishable, and others too small to be resolved are suggested by the non-uniformity of the surface appearance of the section. When it is considered that the smallest globule of $CuAl_2$ resolvable with a high-power microscope contains about 2,000,000,000 molecules, it is evident that with rapid cooling sub-microscopic particles of $CuAl_2$ must be present in large numbers; in fact, after quenching, the average size of particle must be sub-microscopic. The whole phenomenon of ageing must therefore involve changes which cannot be studied directly with a microscope.

We must also accept the proposition that the change in properties on ageing are due to molecular changes within the metal; that those molecular rearrangements are not possible in liquid air; that they take place slowly at ordinary temperature, and more rapidly as the temperature is increased. We can visualise these molecular rearrangements best by assuming that the precipitation of $CuAl_2$, and segregation into particles, are two distinct steps. Immediately after quenching duralumin from 500° the excess $CuAl_2$ is thus considered to be precipitated; some of it will have formed into small particles, and some will be precipitated as single molecules which have little or no adhesion with the particles of the matrix. This condition produces the low mechanical cohesion observed in duralumin after quenching and before ageing. The increase in cohesion of the whole mass could be brought about by the agglomeration of these precipitated molecules of $CuAl_2$. In the first place, the particles of the matrix would establish cohesion bonds with one another in the space formerly occupied by a $CuAl_2$ molecule. This would increase the cohesion of the matrix. Then the small globule, made up of many $CuAl_2$ molecules, would acquire its own specific cohesion.

Having thus produced increased cohesion of the matrix and the $CuAl_2$ particles, we have only to account for a strong adhesive bond between these to account for the observed increased cohesion or hardness of aged duralumin.

It will be remembered that some $CuAl_2$ is soluble in the matrix at room temperature, and therefore it is only the excess that can form into minute globules. The presence of a globule of $CuAl_2$ acts as a centre of crystallisation, and hence easily attracts to itself the adjacent excess $CuAl_2$ molecules in the matrix, and impoverishes the matrix at the boundary. This accomplishes two things, namely, it facilitates migration of $CuAl_2$ towards the globule by the forces of diffusion, and it reduces the number of $CuAl_2$ molecules in the matrix at the boundary with the globule to normal saturation, which is the condition for maximum adhesion between $CuAl_2$ and the matrix. Thus the strong adhesion bond between these two substances is established. It is probable that the concentration of a saturated solution of $CuAl_2$ in aluminium in the absence of $CuAl_2$ nuclei is greater than when these nuclei are present. It is also probable that the actual boundary between a $CuAl_2$ particle and the matrix is an amorphous solution of $CuAl_2$ in aluminium.

According to the above, the reason that maximum diffusion does not produce maximum cohesion is that the adhesion bonds between the excess $CuAl_2$ molecules and the matrix are not strong, and the spaces which they occupy might act as voids in affecting cohesion. Ageing removes the voids from the matrix, thus increasing its cohesion; it establishes cohesion in the newly formed $CuAl_2$ globules, and adhesion between these and the matrix. If the particles of $CuAl_2$ continue to increase in size beyond a certain average, and decrease in number, as in prolonged ageing, at 200°, the cohesion decreases.

A study of this question is necessary in order to change the specific composition and heat treatment of the alloy to meet certain engineering requirements. The author and Mr. R. S. Archer are preparing a paper on the general subject of the heat treatment of aluminium base alloys which will discuss these questions in more detail.

British Gas Light Company

Suggested Further Issue of Capital

AT the half-yearly ordinary general meeting of the British Gas Light Co., Ltd., held on Wednesday in London, Mr. R. S. Gardiner (chairman) gave some interesting figures as regards costs. The cost of coal during the half-year amounted to £136,640, as compared with £114,757 in the corresponding period of 1918. As a matter of fact, they had carbonised 3,514 tons less of coal, whilst the cost, it would be seen, was £21,882 more. The cost of wages and salaries for the half-year amounted to £106,186, as compared with £69,444 in the previous corresponding half-year, showing an increase of £36,742. As compared with the corresponding period of 1914, the cost of wages exhibited an increase of £47,837. The net addition to the capital account for the half-year amounted to £11,398, and this was almost entirely due to the purchase of land at Norwich. Shareholders would understand that, in the present circumstances, with the very high cost of materials, the directors were giving the utmost care to any outlay on capital account. The capital account per million cubic feet sold now stood at £559. The percentage of gas unaccounted for during the twelve months to June 30, 1919, was 3.95 per cent., and that was exceedingly creditable to their engineers. This compared with the previous average of 5.17 per cent. The net profit for the half-year was £15,470, which compared with a profit of £5,661 in the previous half-year.

He had been very surprised to find that the issue of the report and accounts had been followed by a rather sensible drop in the market value of their shares, and he failed to see any justification for that drop. For the past twelve months the company had suffered very much at Hull, which was their principal station, owing chiefly to the unsuitable character of the coal supplied to that station; this had resulted in severe damage to the carbonising plant, which had been especially selected for the distillation of Yorkshire coal. Consequently, very poor results had been obtained from the class of coal which was supplied, and the result was that the profits at Hull for the previous half-year were only £1,116. For the half-year under review, however, a very considerable improvement had been shown, and the profits at Hull amounted for that period to £9,114. This figure, however, still fell short of the interest which Parliament had fixed as the return on the capital at that station by about £11,000, but the improvement which was now taking place would, he was confident, be more than maintained during the present half-year, and any anxiety that might have been occasioned by the poor results in the second half of last year should, he thought, be dispelled by the considerable recovery that had already taken place at Hull. The directors had now decided, having regard to the increase of 6s. per ton which had been imposed on the company in the cost of coal, the reduced working hours, and to the fact that the returns were not realising the Parliamentary rate of interest, further to increase the price of gas to 4s. 6d. as from October 1. They had also reluctantly decided to increase the rent of the meters and the stoves in view of the increased cost of labour and of material.

The directors were now considering the proper time to make a further issue of capital, and whether it should take the form of Ordinary shares, Preference shares, or Debentures. The first offer would be made to the shareholders. In past years it had always been the practice of the company, whenever they issued capital, to offer it to shareholders at a slight reduction upon the market value, and that practice would be adhered to in this instance.

From Week to Week

EXTENSIONS ARE TO BE MADE to the premises of the Rushden Tanning Co.

PLANS HAVE BEEN PASSED for a motor spirit depot at Old Sporeham Road, Hove, for the British Petroleum Co.

OIL STORES AND WORKSHOPS at Palmer's Works, Jarrow, have been destroyed by fire.

THE SELBY URBAN DISTRICT COUNCIL has passed plans submitted by the Selby Chemical Co., Ltd., for a new factory on the Holmes.

NEW WORKS, to occupy an area of from four to five acres, are to be erected at Laighpark, Renfrew Road, Paisley, for the Western Chemical Co., Bogston, Greenock.

SIR EDWARD STERN and Mr. Festus Kelly have recently been appointed on the committee of management of the British Sugar Beet Growers' Society.

LONDON NITRATE CO.—The Debenture stock transfer books will be closed till September 30 for the purpose of paying the half-yearly interest on the Six per Cent. Debenture stock.

THE BURNLEY CORPORATION IMPROVEMENTS COMMITTEE has passed plans for an extension to the dye works at Cavour Street belonging to Messrs. H. Greenhaigh & Co., Ltd.

A FINE OF £5 was imposed on the Severn Engineering Co., Worcester, on Tuesday, for keeping 10 cwt. of calcium carbide without a license.

THE WESTERN COUNTIES BASIC SLAG CO., Manchester, have been fined £3 3s. for selling their basic slag deficient in phosphate. The analyst's report showed a deficiency of 16.6 of phosphate.

A REUTER'S MESSAGE from Marseilles, states that a great fire broke out on Sunday in the American camp at Miramas, Bouches du Rhône. The nitrate depots of the powder works of Saint Chamas, which are relatively near, also caught fire.

MR. HUGHES ANNOUNCED in the Australian House of Representatives that the Imperial Government had promised to advance £500,000 for the purpose of fostering the treatment of spelter in Australia.

MR. WALTER ROBERT KING, Torville, Westcliffe, Southend, joint governing director of Messrs. Tÿpke & King, Ltd., manufacturing chemists and rubber substitute makers, has left estate valued at £112,688.

THE AIR RAID COMPENSATION COMMITTEE is dissolved, and their office at 13, Abchurch Lane, King William Street, E.C., will be closed as from October 1. All correspondence regarding the businses of the Committee should after that date be addressed to the War Risks Insurance Office, 53, Cornhill E.C.

MR. WILLIAM JOHN REES, of The Laurels, Mount Pleasant, Swansea, and of Bryn-y-mor Villa, Eaton Grove, Swansea, a director of the Swansea Gas Light Co., the Pontardulais Gas Co. the Cwmfelin Steel and Tin Plate Co., Ltd., &c., has left estate valued at £157,559.

THE BRITISH ASSOCIATION OF RESEARCH for cocoa, chocolate, sugar, confectionery, and jam trades has been registered as a company limited by guarantee, without share capital, not formed for purpose of profit, the word "limited" being omitted from the title by license of the Board of Trade.

THE BRADFORD DYERS' ASSOCIATION, in the development of their welfare scheme, have purchased the Cambridge House Estate, in Little Horton Lane, for the use of the staff at head-quarters, and the branches of the Association. The purchase price is £3,500, and the building will be equipped as a social centre, with billiard tables, library, &c.

REPRESENTATIVES OF THE IRISH CHEMISTS' FEDERATION and the Shop Assistants' Union from Dublin, Belfast, Limerick, Waterford, Cork, and other parts of Ireland met last week at the offices of the Ministry of Labour to consider a demand for a new rate of wages and improved conditions of employment put forward by the assistants for the whole of the country.

THE RIKSDAG recently gave the Swedish Government the power to form a sugar import monopoly, which will thus be the only body to import sugar into Sweden. The reason for this step is that the beet growers have been guaranteed a minimum price, and as this price is comparatively high, an unrestricted import of cheap sugar would result in loss to the Government, who would have to compensate the local industry. At the present time the price of imported sugar is higher than the price of Swedish sugar, but it is expected that the monopoly will be formed shortly.

AN EXTENSIVE DYEWOOD and chemical factory, owned by British capitalists, and to be known as the Yorkshire Dyeware & Chemical Co., is being completed at the South-western end of Jamaica. The factory buildings are situated on a site of 27 acres, the buildings alone covering six acres. Extensive machinery is being installed, and it is hoped that the factory will be in operation by the end of the year. To facilitate the purchase and transport of dyewoods, the company owns its own schooners. The undertaking will provide steady employment for a large number of hands.

THE TREASURY ANNOUNCE that for the purpose of recovery under the scheme for the settlement of enemy debts of the amounts due on unpaid coupons or matured bonds of enemy stocks, a declaration will be required that the coupons or bonds have remained in physical possession in the United Kingdom since Sept. 30, 1914, or since they were made a good delivery by the Committee of the Stock Exchange, or that they have remained the absolute property of British subjects since September 30, 1914. Coupons and bonds in respect of which the above declaration cannot be given will not come within the scope of the enemy debts scheme.

THE CEYLON DEPARTMENT OF AGRICULTURE and others interested in the mattter are giving close attention to the cultivation of the castor oil plant outside tea ground areas, in view of the increased demand for castor oil. At a recent meeting of the Ceylon Chamber of Agriculture at Colombo, members had the matter under consideration and proposals were adopted for facilitating the introduction of machinery for crushing the seeds and purifying the oil. Experiments carried out by means of an ordinary village press produced 20 per cent. of oil obtained by the cold drawn process. With a larger press the yield was 33 per cent..

THE GOVERNMENT OF INDIA have prohibited the import into India, except under licence, of all derivatives of coal tar, generally known as intermediate products, capable of being used or adapted for use as dyestuffs, or of being modified or further manufactured into dyestuffs; all direct cotton colours, all union colours, all acid wool colours, all chrome and mordant colours, all alizarine colours, all basic colours, all sulphide colours, all vat colours (including synthetic indigo), all oil, spirit and wax colours, all lake colours, and any other synthetic colours, dyes, stains, colour acids, colour bases, colour lakes, leuco acids, leuco bases, whether in paste, powder, solution or any other form. Applications for import licences should be addressed to the Collector of Customs at the port through which it is desired to import the goods. It is understood that licences will be obtainable for dyestuffs and intermediate products manufactured in the United Kingdom.

THE VISIT OF REPRESENTATIVES of the British Union Oil Co., to Barbados is stated to have been a source of satisfaction to all sections of the community. The company not only intends to establish an oil station for the bunkering of steamships, but also to bore for oil throughout the Colony and ascertain whether Barbados contains sufficient oil for commercial purposes. The company has begun operations in earnest. Boring machinery has, according to a *Times* correspondent at Kingston, already been landed at Bridgetown, and leases have been obtained from landowners giving the concern the right to bore for oil. During a debate in the House of Assembly on a Bill to grant the company the needed concessions, it was urged that one reason why the concern should be supported was that it possessed British shareholders, British money, and British directors. The Bill was unanimously adopted by the House. The belief that oil of a high grade is to be found in Barbados has been held by many experts who have visited the island from time to time.

ACCORDING TO THE *Times Trade Supplement* the terms and conditions on which American coal is being offered to Germany are as follows: Monthly deliveries of 50,000 tons of steam and gas coal at $26 per ton, c.i.f. Rotterdam, Antwerp, or French Atlantic port, payable in instalments, buyer and seller giving banker's security for 15,000 tons. The quoted price is equal to 425 marks, whilst the best German coal costs 80 marks per ton. The American offers have been accepted in Eastern Germany, in view of the utter impossibility of obtaining home coals, and they work out at 550 marks per ton. The United States is also opening up her zinc mines and supplying upper Silesia with her requirements since in that German province there has been an utter collapse of the zinc industry, and from being an

exporting country Silesia is now obliged to import every ton of zinc she wants. The losses in the trade run into millions and the Hohenlohe mine (with a former annual production of 50,000 tons) and the Donnersmarck mine have shut down, whilst others are following suit.

WRITING ON THE recent progress made in the Australian industries, *The Times* correspondent at Sydney states that it is only within the last twelve months that there has been any concerted move to associate scientific investigations with the conduct of Australian industries. The following information is from a brief abstract of what has been accomplished and what is in progress: Specimens of the water hyacinth or river weed have been analysed. The results show that the plant can be used as a source of potash. Methods for obtaining potash salts from various Australian deposits of alunite have been worked out. If certain important developments now proposed take place, potash from alunite will be available as a fertiliser to be used in the manufacture of artificial manures in Australia. A fundamental investigation into the chemical constitution of "grass tree" resin has already resulted in the isolation of several new substances not previously known as a constituent of resin. Following on the work done on the subject of power alcohol and alcohol engines, a method has been discovered for starting these engines from cold.

AT BOW-STREET POLICE COURT last week, before Mr. Graham Campbell, Albert Evan Whatcott (29), general dealer, of Pyrland Road, Canonbury, was charged on remand with stealing 40 tons of scrap lead, valued at £1,291, the property of the Ministry of Munitions. Mr. Travers Humphreys, who prosecuted, said that at the time this matter arose the defendant occupied a high position at the Ministry of Munitions. From September 17, 1917, the Ministry took possession of all the lead in the country and allocated it to firms engaged on Government contracts, or on work in respect of which a priority certificate had been obtained. The defendant was virtually the head of the department dealing with that matter. After the Armistice he proceeded by an ingenious trick, to obtain a large quantity of lead for himself without payment. He invented a firm which he called the Premier Metal Foundry (Ltd.), and in that name put forward a requisition for 40 tons of lead, representing that it was required for the use of printers. He passed the requisition to one of his clerks, instructing him to allocate the full amount. The lead was duly delivered to an address in Verulam Street, Gray's Inn Road, and was afterwards sold by the defendant to a Mr. Elias Barnett for about £1,300. A further remand was ordered, the defendant being allowed bail as before in £400. The hearing was resumed on Wednesday and again adjourned.

Obituary

PROCTOR.—The death is annnounced, at the age of 65, of Mr. William Sedgwick Proctor, of Buckinghom Mount, Headingley, Leeds. Mr. Proctor was secretary of the Yorkshire Iron & Coal Co., in which Company he had been employed from the age of 14.

LOTT.—The death occurred last week of Mr. F. E. Lott, a member of a firm of analytical chemists to the Burton Corporation. Mr. Lott was closely identified with the public work of the borough in various forms.

SQUIRE.—Sir Peter Wyatt Squire, who held the appointment of chemist and druggist to the Royal Family for half a century, has died at Shepperton, aged 72. His father, Peter Squire, created the well-known business which gained the confidence of eminent practitioners, and a clientèle of no less eminent customers. Sir Peter carried on the traditions, and "Squire's" is a name well esteemed in the medical world. The "King's Chemist," as he was often called, was also an authority on punting, and had written on that form of river enjoyment. He was a genial and cultured man, and was knighted in 1918.

SCHELSINGER-DELMORE.—A Johannesburg cable reports the death on the rand of Dr. Jaques Schelsinger-Delmore, the well-known industrial and metallurgical chemist. Dr. Schelsinger went to the Transvaal in 1889, and resided in Pretoria in 1893. He was retained by the former Government to do all the work at the analytical laboratory. Since 1896 he has been closely associated with the New Transvaal Chemical Co., which is the most successful concern of the kind in South Africa.

Seizure of Pyrogallic Acid

IN the Vacation Court on Wednesday, Mr. Justice Greer again had before him the matter of Brown v. Buckley, in which the plaintiff, John Brown, trading as Brown & Forth, at London and Manchester, sought to restrain the defendant, an officer of his Majesty's Customs, from detaining 5 cwt. of pyrogallic acid, lying at Manchester. The defendant claimed to be acting by virtue of a Proclamation of March, 1916, in connection with the Customs Law Consolidation Act, 1876, by which the importation of gunpowder and other articles was prohibited. The plaintiffs said that this did not apply to the particular article.

Mr. Wright, in opening, read an affidavit which said that the plaintiff was a dealer and importer of chemical materials, carrying on business in London and Manchester, and the defendant was an officer of Customs. In May, 1919, the plaintiff ordered 5 cwt. of pyrogallic acid from the Mallinckrodt Chemical Works (Limited), of Montreal, Canada. The consignment was shipped on the s.s. *Bevie* at New York about July 29, and arrived at Manchester about August 17. By a notice of seizure dated August 29, the defendant, who was an officer of Customs and Excise at Manchester, purporting to act under the Customs Consolidation Act, 1876, informed the plaintiff that the Commissioners of Customs and Excise, by virtue of their powers under the Customs Acts, seized the goods in question as forfeited on the ground that they had been imported into the United Kingdom in contravention of a Royal Proclamation prohibiting their importation except under licence of the Board of Trade.

Mr. Wright submitted that the Executive had no power to issue any such prohibition as they purported to do here. It followed that the seizure of the goods was a wrongful act. Pyrogallic acid was an ordinary article of commerce and had no relation at all to "arms, ammunition, gunpowder," or kindred matters. The seizure of the plaintiff's goods, he contended, by the defendant was without any colour of right at all. The seizure was unjustifiable and the plaintiff was entitled to immediate redress.

The Attorney-General submitted that the proceedings were entirely misconceived. The action was started in the Chancery Division by a writ issued on September 17. The plaintiff claimed a declaration that the defendant had no lawful authority to deal with the goods; a declaration that the proclamation under which the goods were seized was invalid; an injunction to restrain the defendant from acting in respect of the goods under the proclamation; and delivery of the goods. The plaintiff started the action notwithstanding that proceedings had already been started under section 207 of the Customs Consolidation Act, 1876, to condemn the goods. In such proceedings, every question raised by the plaintiff could be decided. The position was that the goods were seized and notice of seizure was duly given on August 29. A claim for the goods was duly made by the plaintiff on September 1, which would be decided in the proceedings under section 207 of the Act of 1876. Pending those proceedings it was impossible for the Commissioners of Customs to dispose of the goods unless the goods were perishable, which was not the case. The defendant was a junior Customs officer and the goods were not under his control, but were under the control of the Commissioners of Customs. So that any order made against the defendant would be nugatory. Moreover, there was no ground for an interim injunction to prevent somebody from detaining or dealing with the goods. The plaintiff asked for the delivery up of the goods. To grant such an application was unheard of in an interlocutory proceeding. The present proceedings were entirely misconceived and unnecessary. The application should be dismissed.

Mr. Justice Greer said that he did not think it was necessary to deliver a judgment. His Lordship was inclined to think that the plaintiff's construction of section 43 was the right one. But he regretted that it was not possible to decide the question finally on that application. It was not right to decide a question of such importance in an interlocutory proceeding. It was a question of grave importance to the plaintiff and to other traders. The application would be refused, but without any order with regard to costs.

DR. STEPHEN MIALL contributes to the current number of *Chimie et Industrie*, the journal of the *Société de Chimie Industrielle* of France, an article on the recent inter-allied conference in London.

References to Current Literature

Only articles of general as distinct from specialised interest are included and given in alphabetical order under each geographical subdivision. By publishing this digest within two or three days of publication or receipt we hope to save our readers time and trouble; in return we invite their suggestions and criticisms. The original journals may be consulted at the Patent Office or Chemical Society's libraries. A list of journals and standard abbreviations used will be published at suitable intervals.

British

COAL. The sampling of coal. F. S. Sinnett. *Bull. No. 2, Lancashire and Cheshire Coal Research Association.* An endeavour to promote a standard method of sampling.

DYEING. Dyeing machines. F. Smith. *J. Soc. Dyers and Col.*, September, 207-212. A discussion of machines for dyeing loose material.

FOOD. Problems of food and our economic policy. H. E. Armstrong. *J. Roy. Soc. Arts*, September 19, 681-692. The third of the series of Cantor lectures. (See also CHEMICAL AGE, pp. 368, 396.)

American

PLATINUM. Geology of platinum deposits. W. L. Uglow. *Eng. and Min. J.*, September 6, 390-393. A description of occurrences of platinum as placer deposits and in association with other minerals.

Colonial

COAL. Notes on Natal coal. J. S. Jamieson. *J. S. Afr. Assoc. Anal. Chem.*, July, 3-7.

GOLD. The solution of gold in cyanide solutions. H. A. White. *J. Chem., Met., and Min. Soc. S. Afr.*, July, 1-8. Experiments were made to determine the best conditions for dissolving gold.

NITRATES. Notes on iodine in nitric acid and sodium nitrate. E. A. White. *J. S. Afr. Assoc. Anal. Chem.*, July, 7-12. The presence of iodine in sodium nitrate may have an ultimate effect on the heat test of nitro-glycerin.

The Prieska nitrate beds. E. G. Bryant. *J. S. Afr. Assoc. Anal. Chem.*, July, 12-19. The geological formation and commercial possibilities of these (South African) deposits are considered.

PORCELAIN. The porosity of porcelain. C. C. Farr. *New Zealand J. Sci. and Tech.*, July, 302-307. Experiments were made with special reference to porcelain for high-pressure electrical insulators.

French

DISTILLING. New laboratory distilling column. Methods of comparing apparatus of this type. M. H. Robert. *Bull. Soc. Chim.*, August, 463-472.

REFRACTORIES. Refractory properties of aluminous products. H. le Chatelier and B. Bogitch. *Comptes rendus*, September 15, 495-499. An account of experiments with bauxite, corindite, and carborundum.

SODA. Lake Magadi and the deposits of natural sodium carbonate. P. Kestner. *Bull. Soc. Indus. Nord de la France*, July, 51-64. An illustrated description of the deposits.

ZIRCONIUM. Determination of zirconium as phosphate. P. Nicolardot and A. Réglade. *Ann. Chim. Analyt.*, September 15, 278-281.

German

BALLOONS. Permeability of rubbered balloon fabrics to gases. W. Frenzel. *Chem. Zeit.*, August 19, 530-532. A method involving the use of the interferometer is described for testing permeability.

COAL. The rational utilisation of coal. E. R. Besemfelder. *Chem. Zeit.*, August 16, 521-523.

Mineral oil and coal. E. Donath. *Chem. Zeit.*, August 7, 497-499. The origin of coal and petroleum is discussed.

IRON. Estimation of iron in iron ores by means of permanganate. R. Schwarz. *Chem. Zeit.*, August 7, 499-500.

MANIHOT. Technical utilisation of *manihot* seeds. C. Grimme. *Chem. Zeit.*, August 9, 505-506. The possibilities of utilising oil and oil-cake from various kinds of *manihot* seeds is considered.

PATENTS. The Anglo-Saxon war on German patents and trade marks. *Chem. Zeit.*, August 23, 542-543.

PHOSPHATES. A revolution in phosphate fertiliser manufacture. W. A. Dyes. *Chem. Zeit.*, August 14, 518. Notes on the use of finely ground phosphates in place of superphosphates.

RESIN. Estimation of resin in mixtures of resin and pitch. A. Wogrinz and P. Vàri. *Chem. Zeit.*, August 9, 506-507.

SACCHARIN. Methods for the quantitative estimation of benzoic sulphinide (saccharin). O. Beyer. *Chem. Zeit.*, August 21, 537-538. Various methods have been tested comparatively.

SALT CAKE. Sodium sulphate manufacture without the use of sulphuric acid. G. Pollitz. *Chem. Zeit.*, August 14, 517-518. Notes on modern practice of the Hargreaves process.

ZINC. Valuation of metallic zinc. S. Rothschild. *Chem. Zeit.*, August 19, 529-530.

Scottish Shale Oil Industry

A Loss of £190,000 per Annum

IT is reported that the Scottish Oils Company have in contemplation a big scheme for utilising Port Edgar, opposite Rosyth, on the Firth of Forth, as a centre to which crude oil will be shipped and then transferred to the West Lothian oil works to be refined. Under that scheme West Lothian would continue to be a great distributing centre for oil and its products.

According to a *Times* correspondent, the whole of the oil industry in Scotland is in a very serious position. By the end of this week, it is feared, about 9,000 shaleminers and oilworkers will be idle. The principal employers are now combined in one company—Scottish Oils (Limited)—which was floated after negotiations wth the Anglo-Persian Oil Company. In a statement on the financial position, the Scottish Oils Company say that, owing to the payment of the Sankey award of 2s. a day, entailing an additional working charge of over £250,000 per annum, and the advance of 6s. a ton in the price of coal since July 15, entailing a further additional working charge of £215,000 per annum, the industry is now being worked at a loss of about £190,000 per annum, not allowing for depreciation or any return on capital. The demand of the workers that the working day should be reduced from eight hours to seven hours would entail a further large loss. While desirous of meeting the views of the shale-oil workers to the fullest extent in their power, they point out the impossibility of carrying on the industry under these conditions, and state that if the terms of the miners are insisted on there will be no alternative but to close down the industry of shale mining.

The men have resolved not to give way, and on Wednesday final instructions were issued by the Scottish Oil Company to shut down practically all the shale-mines in Midlothian and West Lothian. The retorts at the oil works were drawn on Wednesday and the workmen's services dispensed with. In some mines the pumps will be kept going after Saturday, but other mines are expected to close altogether.

MRS. DUNDAS, sole partner of the Dundas Chemical Co., appeared at Dumfries last week before Sheriff Milne on charges of having failed to pay National Insurance contributions in respect of six of her employees. The charge involved 173 individual offences, thus rendering the respondent liable to a total penalty of £1,700. A fine of £6 was imposed.

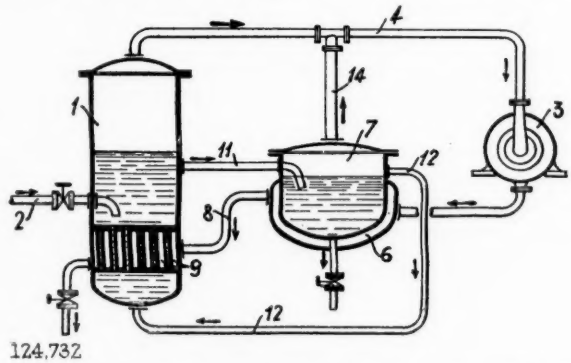
Patent Literature

We publish each week a list of selected complete specifications accepted as and when they are actually printed and on sale. In addition, we give abstracts within a week of the specifications being obtainable. Readers can thus decide what specifications are of sufficient interest to warrant purchase, the only way of obtaining complete information. A list of International Convention specifications open to inspection before acceptance is added, and abstracts are given as soon as possible.

Abstracts of Complete Specifications

124,732. Concentrating or Evaporating Liquids, Process for. P. E. Matter, Aarau, Switzerland. International Convention date (Switzerland), March 28, 1918.

Lye to be concentrated is passed into the vessel 1 by the pipe 2, and evaporated by the tubular heater 9. The vapour is withdrawn through the pipe 4 by the pump 3, compressed, and passed into the jacket 6 of the second evaporator 7 to act as the heating agent. The vapour from this jacket passes by the pipe 8 to the heater 9. The partly concentrated lye passes from the vessel 1 by the pipe 11



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into the vessel 7, and the vapour from that vessel is withdrawn by the pipe 14. In order to maintain a circulation of liquid, the two vessels 1 and 7 are connected by a pipe 12. The vapour from the lye is thus used as the heating agent, and is used first for heating the most concentrated lye and then the less concentrated. When a number of vessels are used in series, the vapour from the compressor is passed first through the last of the series and then in parallel through the other vessels.

131,321. Oxygen and Nitrogen from Atmospheric Air, Process and Apparatus for Producing Chemically Pure. E. Barbet & Fils & Cie., 5, Rue de l'Echelle, Paris. International Convention date (France), January 31, 1917.

Relates to a continuous process, which is described in detail, for obtaining pure oxygen and nitrogen from air, partly liquid, and partly gaseous near the liquefying point, in a fractionating column of the plate type. The liquid air and the cooled gaseous air are obtained by using the cooled oxygen and nitrogen obtained in the process. All the inert rare gases are eliminated.

131,328. Hydrogen, Manufacture of. Dr. E. K. Rideal, 48A, Cornwall Gardens, London, S.W. 7, and Dr. H. S. Taylor, 21, Gower Street, London, W.C. 1.

Hydrogen is manufactured by passing steam over heated iron. The iron oxide thus produced is treated with a mixture of carbon monoxide and carbon dioxide. The effluent gas is passed through a producer containing incandescent coke at about 800° C., whereby the dioxide is converted into monoxide, either wholly or partly. The resulting gas is then used for the reduction of a further quantity of iron oxide, so that the process is cyclic. To start the plant, steam may be passed into the producer, thus generating water gas, which is used in the preliminary reducing stage. The effluent gas containing carbon dioxide is then passed to the producer as described above. The temperature of the producer is maintained by periodical blowing with air or oxygen.

131,334. Nitric Anhydride, Manufacture of. F. Gros and Bouchardy, 39, Rue Cambon, Paris. International Convention date (Switzerland), May 16, 1917.

Two gaseous currents, one containing ozone and the other containing an oxide of nitrogen between N_2O and N_2O_5, are caused to react. Nitric anhydride, N_2O_5, is produced, and is condensed out at a temperature below —20° C., preferably —80° C. The ozone and oxide of nitrogen should be present in the reacting gases in the proportion of their chemical equivalents. The nitric anhydride may alternatively be separated by solution in an inert solvent, such as concentrated nitric acid or sulphuric acid, or a mixture of sulphuric acid and sulphur trioxide, or carbon tetrachloride.

131,335. Nitric Acid, Manufacture of Concentrated. F. Gros and Bouchardy, 39, Rue Cambon, Paris. International Convention date (Switzerland), June 2, 1917.

Nascent nitric anhydride, produced as in the preceding abstract, is combined with dilute nitric acid.

131,336. Nitric Acid, Manufacture of. F. Gros and Bouchardy, 39, Rue Cambon, Paris. International Convention date (Switzerland), June 16, 1917.

Liquid nitrogen peroxide is caused to react with water in the presence of oxygen at a pressure of about 20 atmospheres. A large excess of nitrogen peroxide to water is maintained during the whole reaction, the proportions being never less than 15 to 1. Two non-miscible liquids are formed, the lower being mainly nitric acid of 98-100 per cent. strength, and the upper nitrogen peroxide, with a small proportion of strong nitric acid. The liquids are separated by decantation or otherwise. The time of the reaction is diminished by using oxygen compressed as above, and a temperature up to 30° C.

131,344. Gases from Liquids, Electrically Heated Apparatus for Evolving. B. G. Cooper, 5, Woodend, Sutton, Surrey, and E. A. Griffiths, 4, Meadow Cottages, Teddington. Application date, May 4, 1918.

In evaporating liquefied gases, such as liquid air, the liquid is contained in a vacuum flask packed with material such as fibrous asbestos, silica wool, &c., in which an electrical heating coil is embedded. Movement of the liquid is thereby prevented.

131,346. Liquid Mixtures, Separation of. E. A. Cunningham, 38, Shaftesbury Avenue, London. Application date, May 4, 1918.

The apparatus, which is particularly applicable for the separation of the three isomers of mononitrotoluene, comprises a distilling column having an internal heating coil packed in metallic gauze or the like. The mixture is supplied to the middle of the column from one of a pair of containers, so that one container may be filled while the other is emptying. The unvaporised residue flows out at the bottom of the column to one of two jacketed crystallising tanks maintained at a pre-determined temperature. The tanks may have perforated bottoms, to allow the liquid to be drained from the crystals. The top of the column is at such a temperature that the lowest boiling constituent is vaporised and withdrawn.

131,357. Cellulose Acetate, Manufacture of. J. Radcliffe, Capel Road, East Barnet, Herts. Application date, May 16, 1918.

In the manufacture of cellulose acetate by the acetylation of cellulose in the presence of excess of acetic anhydride, the acetylation is stopped at the desired point by adding water. It is found that a more uniform stoppage of the action is obtained by adding the water in the form of water of crystallisation of a salt, *e.g.*, sodium acetate or sulphate, or alum.

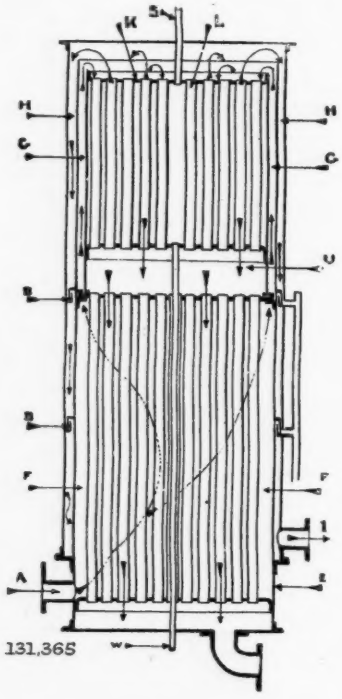
131,358. Ammonium Nitrate, Production of. A. C. D. Rivett, University of Melbourne, Australia. Application date, May 16, 1918.

In the process for producing ammonium nitrate by the action of ammonium sulphate and sodium nitrate, the removal of the resulting sulphate is facilitated by passing ammonia gas into the solu-

tion, and thereby forming the double ammonium sodium sulphate. The ammonia may be added only after a preliminary separation of sodium sulphate has taken place, and the ammonia may be subsequently removed by subjecting it to reduced pressure.

131,365. Oils and other like liquids, Apparatus for distilling the lower boiling constituents from. E. Whittaker, Townend House, Deepcar, Sheffield. Application date, May 21, 1918.

The apparatus is for the purpose of obtaining from oils the lowest boiling constituents, such as benzol or its homologues. The oil enters the vessel E by the pipe A, and passes upward over the tubes F into the annular space G in the upper vessel.



The oil then overflows on to the tube plate K and trickles down through the tubes L into the space U. The tubes L are heated by steam, which enters by the pipe S and leaves by the pipe W, and the vapour evolved passes upward into the top of the annular space H, where it is cooled by the liquid ascending the annular space G. Any condensate is collected by the channels B, and uncondensed vapour finally passes out by the outlet I. The oil residue passes from the space U downward through the tubes F, where it heats the fresh oil which is passing upward over the tubes.

131,399. Acetic Anhydride and Acetaldehyde, Production of. Société Chimique des Usines du Rhone (anciennement Gilliard, P. Monnet et Cartier), 89, Rue de Miromesnil, Paris. International Convention date (France), June 22, 1917.

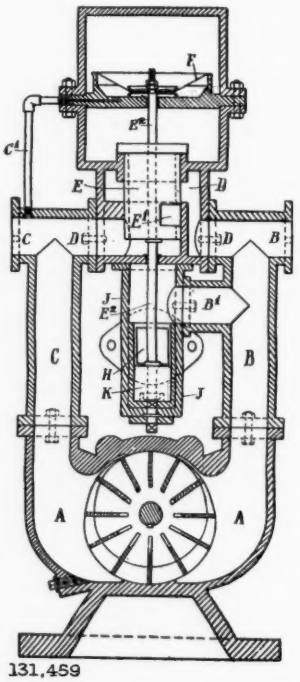
Ethylidene diacetate is heated at atmospheric pressure with a catalyst consisting of an acid or acid salt, sodium pyrosulphate and metaboric acid being mentioned as examples. The temperature is kept below the boiling point of ethylidene diacetate; at a temperature of 125°-135° C., acetaldehyde distils off and the acetic anhydride remains. The action of the catalyst may be modified by adding acetic anhydride or acetic acid as a diluent, and when the catalyst is insoluble in the diacetate or anhydride, it may be dissolved in a neutral substance such as a hydrocarbon, having a boiling point above 140° C.

131,409. Coal, Distillation of. H. J. Toogood, The Poplars, Elland, Yorks, and R. Dempster & Sons, Ltd., Rose Mount Ironworks, Elland, Yorks. Application date, July 16, 1918.

The invention comprises a method of grouping and working intermittently charged retorts which are in permanent communication and in different stages of carbonisation, for the purpose of obtaining coal gas as the first product of distillation, and then water gas by the passage of steam through the incandescent coke.

131,459. Producer or Suction Gas Generators, Gas and Air Mixing Apparatus for. Sharp & Preston, Ltd., and A. Docking, St. Kevin's Engineering Works, Francis Street, Dublin. Application date, August 24, 1918.

The apparatus is designed to produce a correct mixture of producer gas and atmospheric air for supply to heating or melting furnaces, and for case-hardening, carbonising, &c. A rotary compressor A has its suction side B connected to the producer, and its delivery side C to the service pipe. A by-passage D is controlled by a valve E, open at the bottom, and having a side port E^1, and mounted on a vertical spindle E^2. The spindle carries also a piston valve K, working in a casing J, and controlling an air port H, by which air may be admitted through the passage B^1 to the space B. The spindle is provided with a diaphragm F, which is under the influence of the service pressure through the pipe C^1. A decrease in the demand causes an upward movement of the diaphragm F, with a consequential opening of the passage D and closing of the port H, and an increase in the demand



causes an opposite movement of the valves. Reference is directed, as the result of a Provisional Report under Rule 29 of the Patents Rules, 1908, and in pursuance of Sect. 7, Sub-Sect. 4 of the Patents and Designs Act, 1907, to Specifications 27,999 of 1904, 18,130 of 1910, and 113,160.

131,502. Glover Towers and similar apparatus, Filling material for use in. P. Kestner, 34, Rue de Chateaudun, Paris. Application date, October 18, 1918.

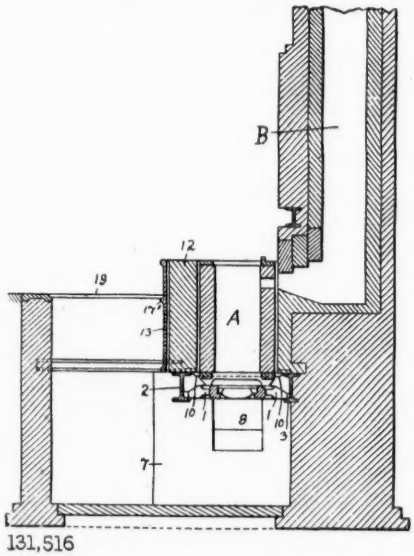
Apparatus for effecting intimate contact between gases and liquids is packed irregularly with rings made of dried and baked ceramic material. The rings are very thin in proportion to their diameter, and may be of various shapes in cross section.

131,512. Sulphur Dioxide, Process for the manufacture of pure. British Dyes, Ltd., J. Turner, and Dr. W. B. Davidson, St. Andrews Road, Huddersfield. Application date, November 1, 1918.

Waste sulphuric acid may be utilised for the production of pure sulphur dioxide by heating it with about 10 per cent. of pitch to a temperature of 150°-200° C.

131,516. Crucible Furnaces. F. S. Wigley, Lynwood, Green Lanes, Erdington, Birmingham. Application date, November 8, 1918.

A number of crucible furnaces A are built at the base of a chimney B. The ends of the fire-bar frames 1 rest on the flanges of two rolled joists 2, 3, the latter being built into the base of the chimney. An intermediate cross wall 7 is provided to support



131,516

the joists, and an opening 8 permits air to pass through. The upper flanges of the joists 2, 3 carry bearer bars 10, which support the dividing walls between the furnaces, and the bars 10 are set downward, so that they are level with the top of the joists 2, 3, to enable the courses of the bricks in the dividing walls and the breast wall 12 to coincide. The plate 13 has a fillet 17^1 to support the ends of the grating bars 19.

International Specifications Open to Inspection

129,624. Thorium Oxide and Salts. Lindsay Light Co., Chicago, U.S.A. International Convention date, July 8, 1918.

Thorium fluoride is precipitated from a solution of rare earth salts and filtered, the filter cake being heated with an alkali carbonate solution which dissolves the thorium fluoride. The thorium is then precipitated as hydroxide.

129,629. Alkali Sulphides. E. Bergve, Notodden, Norway. International Convention date, July 8, 1918.

Alkali-bearing minerals are heated in a furnace with pyrites and ferro-silicon. The upper portion of the charge contains the alkali salts and aluminous material free from iron.

129,962. Cracking Oils and removing Incrustation. F. X. Govers, 80, Riverside Drive, New York. International Convention date, July 18, 1918.

In apparatus in which oil is cracked by forcing it under pressure through heated tubes, the tubes are kept free from incrustation by balls which are carried through them by the current of oil.

129,092. Bitumen, etc., Extracting. H. D. Ryan, 134, South Duke Street, York, Pa., U.S.A. International Convention date, March 25, 1918.

Shale, &c., is digested with heavy oil at a temperature below that at which destructive distillation takes place, and the solution is then discharged into a bath of gasolene to prevent deposition of bitumen on cooling. The light oil is driven off by heating, part of the digest is returned to the retort, and the remainder withdrawn for further treatment.

129,096. Shale, etc., Distilling. G. W. Wallace, 1605, North Forty-sixth Street, East St. Louis, Ill., U.S.A. International Convention date, February 8, 1918.

Shale is distilled in externally heated retorts, and the distillate is withdrawn through central perforated pipes in the retorts, so as to pass through the cooler material as soon as it is formed.

Latest Notifications

132,488-9. Coal Carbonising Furnaces. H. L. Doherty. September 7, 1918.

132,490. Hydrocarbon Liquids, Production of—from carbon, and apparatus therefor. F. P. A. Rousseau. September 9, 1918.

132,496. Fertilisers containing Nitrogen and Phosphoric Acid. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. September 13, 1918.

132,504. Liquid Ammonia, Production of. Norsk Hydro Elektrisk Kvaelstofaktieselskab. September 13, 1918.

132,529. Acetic Acid from Acetylene as the primary material, Catalytical processes for preparing. Soc. des Acieries et Forges de Firminy. March 13, 1918.

Specifications Accepted, with Date of Application

114,838. Evaporating, Condensing and Cooling Apparatus, Tubular. E. Barbet et Fils et Cie. March 31, 1917.

118,635. Evaporating Apparatus. K. L. E. Thunholm. August 23, 1918.

120,039. Regenerative Furnaces of the Soaking Pit type. C. M. Stein et Cie. September 8, 1917.

121,452. Purifying Liquids, Process for. A. Rialland. December 10, 1917.

127,833. Mixing Liquids in Closed Vessels, Apparatus for. E. D. Hansen. March 21, 1917.

131,609. Nitrogen Compound from the Nitrogen of the Atmosphere, Obtaining. C. J. Montgomery and E. R. Royston. June 30, 1916.

131,628. Glycols, Production of. E. G. Bainbridge, and C. Weizmann. June 3, 1918.

131,642. Nitrogen peroxide and Nitric Acid, Process for the Manufacture of Liquid. W. R. Bousfield, and Nobel's Explosives Co. July 2, 1918.

131,647. Cellulose Acetates, Solutions of—and Methods of Joining Articles made of Cellulose Acetate. R. Gilmour, and W. Dunville & Co. July 4, 1918.

131,678. Esters, Process for the Production of. J. Grolea, and J. L. Weyler. February 23, 1918.

131,684. Hydrogen, Nitrogen, and Carbon Dioxide, Manufacture of. J. Harger, and Lever Brothers. August 1, 1918.

131,728. Gas-producers, Furnaces, and the like, Gas-regulating Valves for. W. Simons, and I. B. Evans. August 28, 1918.

131,750. Lime and Bromine, Compound of—and a Process for its Manufacture. J. S. Arthur and L. G. Killby. September 9, 1918.

131,767. Electric Furnaces. British Thomson-Houston Co. (*General Electric Co.*). September 20, 1918.

131,772. Chrome Liquors and Salts, Process of Manufacturing. J. R. Blockey, and W. Walker & Sons. September 28, 1918.

131,788. Washed Coal and the like, Means for Extracting Water or other Liquids from—particularly applicable for Fine Coal for Coking. C. Burnett. November 1, 1918.

Recent Wages Awards

The following awards and decisions have been made by the Court of Arbitration constituted under the Wages (temporary regulation) Act, 1918 :—

Basic Slag Workers.—The British Portland Cement Manufacturers, Ltd., London v. the Workers' Union.

Award.—From the fourth pay period after August 1, 1918, the working week of the men concerned employed at the company's works at Caerwys, near Mold, to be 48 hours a week; overtime, *i.e.*, time worked after the working week of 48 hours is completed, to be paid for at the rate of time and a quarter for the first two hours, and time and a half for all hours until starting time next day; double time to be paid for all hours worked on Sundays, Christmas Day, Good Friday and Bank Holidays. From the first pay period, after August 1, the unskilled and semi-skilled men concerned to receive an advance of 2d. an hour. Claim that the rate of pay for tradesmen be 1s. 6d. an hour, not established.

Chemical Trade.—Brunner Mond & Co., Ltd., Northwich v. the Northwich Joint Trades and Labour Committee. Decision—Application by the firm to withdraw the advance of 2s. 6d. a week granted under the award (No. 447) of the Committee on Production of November 7, 1917, not established.

Glass and Optical Lens Makers.—Chance Brothers & Co., Ltd., Birmingham v. the National Federation of Women Workers and the Workers' Union. Award—The women and girls under 18 years of age concerned, engaged in grinding and polishing lighthouse lenses, to receive advances of 5s. and 2s. 6d. a week, respectively, from the first pay in May, 1919.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, September 25, 1919.

BUSINESS has not been quite so active although there is very little to complain of in the volume of current trade which is passing.

The home trade demand is very steady and buyers are more confident in their operations.

As regards export business, this is still surrounded by considerable difficulties in the shape of the Exchange question, and the trouble in getting the goods shipped promptly owing to dock congestion.

General Chemicals

ACID ACETIC.—The price is very steady for this material, and a fair volume of business is reported.

ACID CARBOLIC is still extremely active, and makers are selling their production with ease.

ACID OXALIC is somewhat unsettled owing to lower Continental offers. Makers' quotations, however, are maintained at previous levels.

ACID TARTARIC is very active, and makers are heavily sold.

ALUM is in demand and is somewhat scarce.

AMMONIUM SALTS.—A fair business is reported, and there is a slight improvement in the demand for carbonate.

ARSENIC is very firm and scarce on the spot.

BLEACHING POWDER is, if anything, slightly better, but the volume of business passing can only be described as moderate.

COPPER SULPHATE is still stagnant, and there is nothing to report in the way of business.

IRON SULPHATE (Copperas) is easy, and only in moderate request.

LEAD ACETATE is in fair demand, and price is steady.

LITHOPONE is in steady request, and a little business appears to have been done in the Dutch make.

MAGNESIUM SULPHATE (Epsom Salts) is easy and in slow demand.

NITRATE OF SODA.—There is a fairly good demand, and prices are well maintained at 20s. to 21s. per cwt.

POTASSIUM SALTS are quiet. A little business has been done in chlorate and prussiate, and there are no changes in price of note to record.

SODIUM ACETATE is easy, and slow of sale.

SODIUM BICARBONATE.—There is a slightly better demand for export account.

SODIUM CHLORATE has been fairly active on recent figures.

SODIUM HYPOSULPHITE is somewhat scarce, and a good business has been done.

SODIUM PHOSPHATE.—This product is steady at recent values, with a moderate business passing.

SODIUM PRUSSIATE has again advanced in price, and is very scarce on the spot.

ZINC SALTS are steady, without change in values.

Coal Tar Intermediate Products

The prices are without change and a steady business has been transacted.

ANILINE OIL has not been so active, but trade is satisfactory.

ANILINE SALT is scarce and the price firm.

ALPHA NAPHTHOL.—There is a good demand for this product, and the English make is in a well-sold condition.

BETANAPHTHOL.—The position here would appear to be slightly easier, but makers are still very full with orders.

Heavy Coal Tar Products

Markets as a whole are without change, and business generally is quite satisfactory.

BENZOLE.—With the majority of the Government stocks disposed of, there is a good feeling in this market, and prices are firm. The export demand is active at about 1s. 11d. per gallon to 2s. per gallon. Home trade values are unchanged.

CREOSOTE is scarce, and prices are firm at about 5¼d. per gallon in the North and 5⅝d. to 6½d. per gallon in the South.

CRESYLIC ACID.—There would appear to be a slightly better business passing, but the value is without change: 2s. 6d. to 2s. 9d. per gallon may be mentioned as the value for pale, 97 per cent., and 2s. 3d. to 2s. 6d. for dark, 95 per cent.

PITCH is in fair demand, and is standing at 82s. 6d. f.o.b. London, and 75s. East Coast, and 65s., f.o.b., West Coast.

SOLVENT NAPHTHA is in increasing demand, and recent values are well maintained.

Sulphate of Ammonia

On October 1 the new prices for home consumption will come into force, and although these are somewhat higher than present prices, they have been received fairly well, and the demand is satisfactory. Export business is still difficult, as practically no licences are being granted. There is a considerable demand for sulphate of ammonia from the Continent, but no transactions are recorded.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	9	to	0	3	0
Acetone, pure	ton	95	0	0	to	97	0	0
Acid, Acetic, glacial, 99-100%	ton	82	10	0	to	84	0	0
Acetic, 80% pure	ton	65	0	0	to	67	10	0
Carbolic, cryst. 39-40°	lb.	0	0	9½	to	0	0	10
Citric	lb.	0	4	4	to	0	4	5
Lactic, 50 vol.	ton	66	0	0	to	68	0	0
Lactic, 60 vol.	ton	83	10	0	to	85	0	0
Oxalic	lb.	0	1	2	to	0	1	2½
Pyrogallic, cryst.	lb.	0	11	6	to	0	11	9
Tannic, commercial	lb.	0	3	0	to	0	3	3
Tartaric	lb.	0	3	2	to	0	3	3
Alum, lump	ton	17	10	0	to	17	15	0
Aluminium, sulphate, 14-15%	ton	14	0	0	to	14	10	0
Aluminium, sulphate, 17-18%	ton	17	10	0	to	18	10	0
Ammonia, anhydrous	lb.	0	1	9	to	0	2	0
Ammonia, .880	ton	32	10	0	to	35	0	0
Ammonia, carbonate	lb.	0	0	6½	to		—	
Ammonia, muriate (galvanisers)	ton	44	0	0	to	45	0	0
Ammonia, nitrate	ton	55	0	0	to	57	10	0
Ammonia, phosphate	ton	115	0	0	to	120	0	0
Arsenic, white, powdered	ton	60	0	0	to	62	0	0
Barium, carbonate, 92-94%	ton	12	0	0	to	13	0	0
Chloride	ton	23	0	0	to	24	0	0
Nitrate	ton	50	0	0	to	51	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Bleaching powder, 35-37%	ton	13	10	0	to	14	0	0
Borax crystals	ton	39	0	0	to	40	0	0
Calcium acetate, grey	ton	21	10	0	to	22	10	0
Chloride	ton	8	10	0	to	9	0	0
Casein, technical	ton	80	0	0	to	83	0	0
Cobalt oxide, black	lb.	0	7	9	to	0	8	0
Copper sulphate	ton	40	0	0	to	44	0	0
Cream Tartar, 98-100%	ton	245	0	0	to	250	0	0
Epsom Salts (see Magnesium Sulphate)								
Formaldehyde 40% vol.	ton	140	0	0	to	145	0	0
Iron perchloride	ton	32	0	0	to	34	0	0
Iron sulphate (Copperas)	ton	4	12	6	to	4	15	0
Lead acetate, white	ton	82	10	0	to	84	0	0
Carbonate (White Lead)	ton	51	0	0	to	55	0	0
Nitrate	ton	57	0	0	to	58	0	0
Lithophone, 30%	ton	44	0	0	to	45	0	0
Magnesium chloride	ton	15	0	0	to	16	0	0

	per	£	s.	d.		£	s.	d.
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	11	10	0	to	11	10	0
Sulphate (Druggists')	ton	17	0	0	to	17	10	0
Methyl acetone	ton	89	0	0	to	90	0	0
Alcohol, 1% acetone	gall.	0	11	6	to	0	12	0
Potassium bichromate	lb.	0	1	6	to	0	1	7
Carbonate, 90%	ton	95	0	0	to	98	0	0
Chlorate	lb.	0	1	1	to	0	1	2
Meta-bisulphite, 50-52%	ton	210	0	0	to	220	0	0
Nitrate refined	ton	58	0	0	to	60	0	0
Permanganate	lb.	0	3	3	to	0	3	6
Prussiate, yellow	lb.	0	1	9	to	0	1	10
Prussiate red	lb.	0	6	0	to	0	6	3
Sulphate 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	4	0	0				
Seconds	cwt.	3	15	0				
Sodium acetate	ton	50	0	0	to	51	0	0
Arsenate, 45%	ton	60	10	0	to	62	0	0
Bicarbonate	ton	9	10	0	to	10	0	0
Bisulphite, 60-62%	ton	32	0	0	to	33	0	0
Chlorate	lb.	0	0	7	to	0	0	7½
Caustic, 70%	ton	20	10	0	to	21	0	0
Caustic, 76%	ton	23	0	0	to	24	0	0
Hyposulphite, commercial	ton	18	0	0	to	18	10	0
Nitrite, 96-98%	ton	57	0	0	to	59	0	0
Phosphate, crystal	ton	27	0	0	to	28	0	0
Prussiate	lb.	0	0	9	to	0	0	9½
Sulphide, crystals	ton	15	10	0	to	16	0	0
Sulphide, solid, 60-62%	ton	20	0	0	to	21	0	0
Sulphite, cryst.	ton	11	0	0	to	11	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
,, Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	38	0	0	to	40	0	0
Tetrachlorethane (Westron)	ton	60	0	0	to	65	0	0
Tin perchloride, 33%	lb.	0	2	4	to	0	2	5
,, Protochloride (tin crystals)	lb.	0	1	9	to	0	1	10
Trichlorethylene (Westrosol)	ton	75	0	0	to	80	0	0
Zinc chloride 102 Tw.	ton	22	0	0	to	23	0	0
Chloride, solid, 96-98%	ton	60	0	0	to	62	10	0
Sulphate	ton	21	10	0	to	23	0	0
Oxide, Redseal	ton	75	0	0	to	80	0	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	0	to	0	3	6
Alphanaphthol, refined	lb.	0	3	6	to	0	3	9
Alphanaphthylamine	lb.	0	2	6	to	0	2	9
Aniline oil, drums free	lb.	0	1	1	to	0	1	2
Aniline salts	lb.	0	1	5½	to	0	1	6½
Anthracene, 85-90%	lb.	0	1	5	to	0	1	6
Benzaldehyde (free of chlorine)	lb.	0	3	6	to	0	3	9
Benzidine, base	lb.	0	5	6	to	0	6	0
Benzidine, sulphate	lb.	0	4	9	to	0	5	0
Benzoic, acid	lb.	0	5	0	to	0	5	3
Benzoate of soda	lb.	0	5	0	to	0	5	3
Benzyl chloride, technical	lb.	0	1	9	to	0	2	0
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	2	3	to	0	2	6
Betanaphthylamine, technical	lb.	0	6	6	to	0	7	0
Dichlorbenzol	lb.	0	0	5	to	0	0	6
Diethylaniline	lb.	0	7	0	to	0	8	0
Dinitrobenzol	lb.	0	1	4	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	2	to	0	1	3
Dinitronaphthaline	lb.	0	2	0	to	0	2	3
Dinitrotoluol	lb.	0	1	10	to	0	2	0
Dinitrophenol	lb.	0	1	3	to	0	1	6
Dimethylaniline	lb	0	2	9	to	0	3	0
Diphenylamine	lb.	0	3	0	to	0	3	3
H-Acid	lb.	0	10	6	to	0	11	0
Metaphenylenediamine	lb.	0	4	6	to	0	4	9
Monochlorbenzol	lb.	0	0	9	to	0	0	10
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	0	to	0	8	0
Naphthionic acid, crude	lb.	0	3	6	to	0	3	9
Naphthylamin-di-sulphonic acid	lb.	0	4	6	to	0	5	0
Nitronaphthaline	lb.	0	1	2	to	0	1	3
Nitrotoluol	lb.	0	1	3	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	3
Orthotoluidine	lb.	0	2	2	to	0	2	3
Orthonitrotoluol	lb.	0	1	6	to	0	1	9
Para-amidophenol, base	lb.	0	14	0	to	0	15	0
Para-amidophenol, hydrochlor.	lb.	0	15	6	to	0	16	0
Paradichlorbenzol	lb.	0	0	4	to	0	0	5
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	1	10	to	0	2	0
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	14	0	to	0	15	0
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	6	0	to	0	7	6
Resorcin, technical	lb.	0	11	0	to	0	12	0
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salicylic acid	lb.	0	2	6	to	0	2	8
Salol	lb.	0	4	9	to	0	5	0
Sulphanilic acid, crude	lb.	0	1	2	to	0	1	3
Tolidine, base	lb.	0	9	0	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Review

THE OCCLUSION OF GASES BY METALS. A General Discussion held by the Faraday Society, November, 1918. Reprinted from the Transactions of the Faraday Society, Vol. 14, Parts 2 and 3. 1919. Price, 8s. 6d.

The Faraday Society devoted an evening in November last to a discussion on "The Occlusion of Gases by Metals," and in the pamphlet under review are embodied the papers and speeches uttered on that occasion, together with some further comments upon the subject which have been communicated in writing since that date.

Sir Robert Hadfield opened the session with an interesting survey of the most important of the investigations on the occlusion of gases hitherto conducted, and laid special emphasis upon the value of the work of the three Frenchmen—Euverte, Pourcel and Gautier, of the Terre Noire Works. They were pioneers in the use of ferro-alloys containing high percentages of silicon to prevent occlusion of gases in steel castings. Short papers on the subject were also communicated by Professor Porter, Mr. Cosmo Johns, Dr. Thomas Baker, and others, and the matter was then thrown open for general discussion. Much interesting information was forthcoming from the various speakers, but little progress was made towards a common agreement regarding the generation or behaviour of occluded gases. Professor Porter rightly says that the discussion did not make it clear how very small quantities of occluded gases can have such great influence on physical properties such as the brittleness of metal. Dr. Baker gave some analyses of gases included in steel, which showed that hydrogen and carbon monoxide are the predominating constituents, but points out that it is not known whether these gases were actually evolved from the steel or were formed by interaction between other evolved gases. Mr. Cosmo Johns suggests that occluded gases have sometimes been generated by reaction between non-gaseous constituents of the metal while cooling.

Sir Charles Parsons, who has been experimenting for years on the artificial production of diamond, says that his experiments tend to corroborate the views of Moissan and Crookes that occluded gases play an important part in the formation of diamond, iron being the matrix in which the diamond is formed. Professor H. E. Armstrong repeated his heretical creed that elementary carbon exists only in the crystalline form, and that the graphite and amorphous forms of carbon are hydrocarbons containing only a very small proportion of hydrogen. He evidently regards the results of Sir Charles Parsons' fascinating experiments to ascertain the effect of compressed hydrogen and compressed carbon monoxide respectively upon molten cast-iron as favourable to the Armstrong doctrine.

Books Received

"Notes on the Black Sand Deposits of Southern Oregon and Northern California." By R. R. Hornor.

"'Blue John' and other forms of fluorite." By Bertram Blount and James Henry Sequeira.

"The Physical Society of London." Pp. 351. Price, 4s., post free, 4s. 3d. (London: Fleetway Press, Ltd.)

"Kelly's Directory of the Chemical Industries." Kelly's Directories, Ltd., London, etc. Pp. 842. 25s.

"The Conditions that Govern Staleness in Bread." By Captain R. Whymper, M.C. Reprinted from *The British Baker*. Wyman & Sons, Ltd., London. Pp. 72.

"Catalysis in Theory and Practice." By Eric K. Rideal and Hugh S. Taylor. Macmillan & Co., Ltd., London. Pp. 496. 17s.

"Some Constituents of Coal Tar and Their Properties." By Dr. Percy Edwin Spielmann. Pp. 35.

Company News

ALBY UNITED CARBIDE FACTORIES, AND NITROGEN PRODUCTS AND CARBIDE CO.—Circulars have been issued to the shareholders of the Alby United Carbide Factories, Ltd., and of the Nitrogen Products and Carbide Co., Ltd., in similar terms, reminding them that in August, 1918, a circular was issued regarding the amalgamation of the two companies; but, owing to negotiations regarding certain conditions proposed by the Norwegian Government, which were not quite clear or acceptable in the form put forward, the directors were unable to recommend that the amalgamation should then be proceeded with. They now state that the Norwegian Government have met them in a friendly spirit, which has resulted in the ambiguity of the wording being removed, and satisfactory modification of the terms to which objection was taken. The legal formalities on this side are now being completed, and the necessary notices of the meetings, together with the report and accounts, will be issued about the middle of next month.

ANTOFAGASTA NITRATE.—For 1918 the net profit was $22,305,520. Dividends amounting to $11,520,000 have been paid, and transferred to the oficinas fund $8,000,000 and to the contingencies exploitation fund $2,000,000, to the amortisation of fund $785,520.

ARGENTINE IRON & STEEL CO.—The report for the twelve months ended February 28, 1919, shows a trading profit of £148,554, compared with £115,687 for the preceding year. The sum of £50,000 has been placed to reserve, and the dividends are maintained at the previous year's rates, the Preference shares receiving 1 per cent. in addition to the fixed 6 per cent., while the ordinary shares get 4 per cent. for the year. The sum of £571 is carried forward to the credit of the preference shareholders, and £1,710 to the credit of the ordinary shareholders.

ASSOCIATED PORTLAND CEMENT MANUFACTURERS (1900).—The directors recommend the payment of 2½ years' dividend, less tax, on the five-and-a-half per cent. cumulative Preference Shares for the period from January 1, 1917, to June 30, 1919, after providing £161,478 for depreciation, reserves, and sinking funds, thus clearing off all arrears. The amount carried forward at June 30 was £125,673, as compared with £190,228 at June 30, 1918. Warrants for the dividend will be posted on October 3.

BRITISH PORTLAND CEMENT MANUFACTURERS.—At the annual meeting a dividend of 8 per cent. was declared. An additional sum of £25,000 is added to the general depreciation reserve account, making the charge for the year under this head £75,000, instead of the £50,000 reserve in the previous year. The depreciation reserve fund at the end of last year amounted to £325,000, and the sum carried forward has been gradually built up to £91,509.

EASTERN CHEMICAL CO.—Net profits for the year ended March 31 were £13,843, and £7,877 was brought forward. A dividend of 10 per cent. is proposed on the Ordinary shares, carrying forward £16,631, subject to excess profits duty.

ENGLISH MARGARINE WORKS (1919).—The directors of the English Margarine Works (1919), Ltd., announce the issue of 500,000 Seven per cent. cumulative participating Preference shares of £1 each at par, and 500,000 Ordinary shares of £1 each at par.

INTERNATIONAL PETROLEUM.—Dividend of 50 cents (equivalent to 2s. 1d.) per share, payable October 1, to holders of record September 27.

JOHN LYSAGHT (LTD.).—The accounts for the year ended December 31, 1917, which were unable to be submitted at the general meeting held on June 27, 1918, are now available, and show a profit, after deducting Debenture interest, of £525,966. For the year ended December 31, 1918, the accounts show, after providing for depreciation and bad debts, total profits of £481,151. After making provision for interest and dividends on the Preference shares, there remains, including amount brought forward, £965,482. The directors recommend a bonus of 4s. per share, free of tax, on the Ordinary shares, in addition to an interim dividend of 10 per cent., free of tax, which has already been distributed (as last year); to reserve £600,000, making it £1,400,000; forward £245,482. The directors further propose to transfer to reserve £200,000, being a portion of specific reserves, which, in their opinion, are not now required, making the reserve fund £1,600,000. It is proposed to capitalise the reserve fund by increasing the ordinary capital to £2,000,000 by the issue of bonus shares to Ordinary shareholders.

MAISELS PETROLEUM TRUST.—The company's manager in Rumania has reported that the title deeds of the company's properties are being held in safe custody in a Government office pending his entering into possession of the properties, which, together with those of the companies of other Allied countries, were, during the German occupation of Rumania, taken over by a German trust. Since the German evacuation these properties have been administered by trustees appointed by the Rumanian Government, from whom the company can without difficulty take them over.

OILFIELDS FINANCE CORPORATION.—The report to June 30 last states that the profit is £64,019, to which is added £14,951 brought in from the previous year, making a total of £78,970. After carrying £40,000 to reserve, there remains a disposable balance of £38,970. The directors recommend a dividend of 20 per cent., amounting to £14,801, leaving £24,169 to be carried forward, less the percentages payable to the directors and executive committee of the board. Subject to the necessary alterations being made in the articles of association, the directors further recommend that the sum of £37,002, part of the amount standing to the credit of reserve, be capitalised and distributed *pro rata* among the shareholders by the allotment of one fully-paid share of 4s. in respect of every two shares now held. Meeting, City House, 48, Cannon Street, E.C., October 1, noon.

PARTINGTON STEEL AND IRON.—The report states that the negotiations with the Treasury relating to excess profits duty and munitions levy are still in progress but approaching a settlement. The directors regret it has not been found possible to complete the accounts in time for presentation to the meeting in September, but it is hoped that a further meeting will shortly be held, when accounts for the four years ended June 30, 1919, will be submitted. The general meeting will therefore be held *pro forma* only, and will be adjourned to a later date. Dividends on the Preference shares at the rate of 6 per cent. per annum were paid on December 31, 1918, and June 30, 1919, respectively, amounting to £21,000, and a dividend of 10 per cent. on the Ordinary shares, which, in the opinion of the Board, is justified by the ascertained profits of the year, has been declared. Meeting, offices of Pearson & Knowles Coal & Iron Co., Warrington, September 29, at 2.30.

PEARSON & KNOWLES COAL & IRON CO.—The accounts for the year ended June 30 show a profit (after making provision for excess profits tax) of £248,141, which, with the balance brought forward (after providing £10,000 voted to the directors) makes £333,500. The directors recommend that £50,000 be added to reserve fund, raising it to £254,000; that the sum of £17,261, which represents the expenditure on capital account for the year, and £17,661 the cost in connection with the new share issue and capital distribution be written off, leaving a balance of £101,599 to be carried forward. The operations of the company have been carried on throughout the year under circumstances of the greatest difficulty. The coal trade has been completely disorganized by the intervention of the Coal Controller, which has resulted in serious loss in that department, to be repaid under the guarantee given in the Coal Mines Control Agreement. The company's foreign trade has suffered from lack of the usual shipping facilities as well as from commercial complications resulting from the war. The reserve fund now stands at £204,000.

PRICE'S PATENT CANDLE CO.—It is officially announced that a contract was signed on Monday, under which Lord Leverhulme offers to purchase the shares in Price's Patent Candle Co., Ltd., paying for each share £40 in cash and the allotment of 32 15 per cent. "A" cumulative preferred Ordinary shares of £1 each in Lever Brothers, Ltd., provided holders of at least 90 per cent. of the shares in the Candle company assent. Price's Patent Candle Co., which was incorporated in 1847, has a capital of £600,000 in fully-paid Ordinary shares of £16 each, and there are debentures for £200,000, bearing 5 per cent. interest. The Ordinary shares at the end of the year were quoted 45, and at the beginning of the present month 52¾. Of late they have steadily advanced on rumours of amalgamation, and on Monday, advanced 5 points to 90. Last year's dividend was £2 17s. 6d. per share.

STAVELEY COAL AND IRON.—The net profits for the year ended June 30 were £279,169, and £7,491 was brought forward. A final dividend of 6¼ per cent. is proposed on the Ordinary shares, making 10 per cent. for the twelve months, and carrying forward £66,831. The Board report that the shortage of labour and difficulties in obtaining materials greatly hindered the erection of new coke ovens and other developments. Mr. C. E. Rhodes has been appointed joint managing director, and Mr. L. N. Barrow has been elected a director.

THE MEXICAN EAGLE OIL CO.—On and after September 25 Definite share warrants to bearer will be ready for delivery at the office of the London financial agents of the company, Messrs. S. Pearson & Son (Limited), 47, Parliament Street, S.W.1, in exchange for provisional certificates with coupons Nos. 12 to 16 attached. Listing forms, which must accompany the provisional certificates, can be obtained from Messrs. S. Pearson & Son, (Limited), or the London Joint City & Midland Bank (Limited), 5, Threadneedle Street, London, E.C.2.

British Goods for Canada

A MEETING for the organisation of a new Canadian Association of British Manufacturers was recently held at Toronto. Trade sections were formed representing the textile, metal, and leather goods, pottery, chemicals, and food products trades. Committees were also appointed on publicity, tariffs, and transportation. Mr. Fields, British Trade Commissioner, announced that he is empowered to appoint expert arbitrators whenever a dispute arises between British and Canadian firms. The membership of the Association includes 350 British firms, and an attempt will be made to double the number. A resolution was unanimously adopted that every member should do his utmost to push the sale of British goods in Canada in preference to all foreign manufactures.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Locality of Firm or Agent.	Materials.	Ref. No.
Scandinavia, Finland, Russia, &c.	Oils: lubricating, benzine, benzol, &c.	663
Trinidad	Carbonic acid gas, Portland cement, fertilizers, &c.	689
Alexandria ..	Colours, varnishes, chemical products	691
Australia (Brisbane)	Oilmen's stores, chemicals	673
Egypt	Aniline dyes, chemicals, caustic soda, paints, &c.	693
Madrid	Chemicals: oxalic acid, tripoli, emery, bismuth, lac, ammonia, essences ..	728
Italy	Chemicals	721
France, Belgium, Roumania ..	Chemicals: boric, citric, carbonic and sulphuric acids, permanganate of potash, sulphate of copper; tanning products; leather	710
Vancouver ..	Soda ash, salt cak (sodium sulphate) bleaching powder (available chlorine 35–37 per cent.); industrial chemicals for use in manufacture of pulp and paper, soap, paint, and fertilizer materials.	
New Zealand (Waipawa, Hawkes Bay)	Glass, china and porcelain ware ..	645A
Canada (Toronto)	Dyes	638

Contracts Open

LOWESTOFT.—(9) Paints, colours and oils; (15) cement. Particulars from Mr. S. W. Mobbs, Borough Surveyor, Town Hall, Lowestoft. Tenders by September 29.

Government Contracts

The following contracts were placed by the Government during August :—

MINISTRY OF MUNITIONS (WAR OFFICE CONTRACTS).

Soda Crystals : Brunner, Mond & Co., Ltd., Winnington, Cheshire; United Alkali Co., London, E.

Wood Preservative : Dussek Bros. & Co., Ltd., London, S.E.

Chemicals : A. Boake, Roberts & Co., Ltd., London, E.; Brunner, Mond & Co., Ltd., Northwich.

Disinfectants : Burt, Boulton & Haywood, Ltd., London, E.; Jeyes Sanitary Compounds Co., Ltd., London, E.; Killgerm Co., Ltd., Cleckheaton; McDougall Bros., Ltd., Manchester; Newton, Chambers & Co., Ltd., Thorncliffe; Phœnix Sanitary Co., Preston; Quilbell Bros., Ltd., Newark; Sanitas Co., Ltd., London, E.; R. Young & Co., Ltd., Glasgow.

Leather : Harvey & Sons, Ltd., Bury; J. & W. H. Hutchings, Ltd., Warrington; Penketh Tanning Co., Ltd., Warrington; Tullibody Tanning Co., Tullibody; Vauxhall Tanning Co., Ltd., Liverpool; Vernon Street Tanning Co., Ltd., Warrington.

INDIA OFFICE: STORE DEPARTMENT.

Brass : Muntz's Metal Co., French Walls.
Bronze : Manganese Bronze Co., London, S.W.
Cement : Ship Canal Portland Cement Co., Ellesmere Port.
Magnesium : Magnesium Metal Co., London, S.W.
Oils : Price's, Ltd., Battersea.

POST OFFICE.

Chloride of Manganese : Thomas & Strachan, Liverpool.

CROWN AGENTS FOR THE COLONIES.

Cement : Associated Portland Cement Manufacturers, London, E.C.
Dynamite, &c. : Nobels Explosives Co., Glasgow.
Oil : C. C. Wakefield & Co., London, E.C.

Stocks and Shares

Commercial, Industrial, &c.

	Quotations Sept. 17.	Sept. 24.
Alby United Carbide Factories, Lim., Ord.	31/32–1 3/32	15/16–1 1/16
Associated Portland Cement Manufrs. (1900.) Lim., Ord.	9 5/16–9 9/16	9 3/8–9 5/8
Bell's United Asbestos Co., Lim., Ord.	2 1/4–2 1/4	2 7/32–2 11/32
Bleachers' Association, Lim., Ord.	1 1/2–1 9/16	1 1/2–1 9/16
Borax Consolidated, Lim., Prefd. Ord.	4 1/2–5	4 1/2–5
Bradford Dyers' Assoc. Lim., Ord.	2 1/4–2 3/8	2 3/16–2 5/16
British Aluminium Co., Lim., Ord.	1 3/8–1 3/4	1 3/8–1 3/4
British Oil and Cake Mills, Lim., Ord.	2 13/32–2 15/16	2 11/32–2 13/32
British Portland Cement Manufrs., Lim., Ord.	33/0–35/0	33/0–35/0
Brunner, Mond & Co., Lim., Ord.	2 1/8–2 1/4	2 1/4–2 3/8
Castner-Kellner Alkali Co., Lim.	2 3/8–2 5/8	2 3/8–2 5/8
China Clay Corporation, Lim., Ord.	1/4–3/8	1/4–3/8
Cook (Edward) & Co., Lim., 4% 1st Mort. Deb. Stock Red.	57–61	57–61
Courtaulds, Lim.	10 3/4–11 1/4	10 3/4–11 1/4
Crosfield (Joseph) & Sons, Lim., Cum. 6% Prefce.	15/16–1 1/16	15/16–1 1/16
Curtis's & Harvey, Lim.	2 9/16–2 13/16	2 9/16–2 13/16
Electro Bleach and By-Products, Ltd., 7% Pref.	.. ..	.. ..
Explosives Trades, Lim., Ord.	20/6–21/6	20/3–20/9
Field (J. C & J.), Lim., Ord.	7/16–9/16	5/8–3/4
Greenwich Inlaid Linoleum (Fredk Walton's New Patents) Co., Lim., Ord.	1/2–5/8	17/32–21/32
Harrisons & Crosfield, Lim., 10% Cum. Prefd. Ord.	1 11/32–1 15/32	1 11/32–1 15/32
India Rubber, Gutta Percha and Tel. Wks. Co., Lim., Ord.	16 1/2–17 1/2	16 1/2–17 1/2
Lawes' Chemical Manure Co., Lim., Ord.	5 3/4–6 1/4	5 3/4–6 1/4
Lever Bros., Lim., 6 % Cum. "A" Pref.	19/6–20/0	19/4 1/2 19/10 1/2
Do. 6 1/2 % Cum. "B" Pref.	19/10 1/2 20/4 1/2	20/0–20/6
Magadi Soda Co., Lim., Ord.	3/4–1	27/32–31/32
Manganese Bronze and Brass Co., Lim., Ord.	11/16–13/16	11/16–13/16
Maypole Dairy Co., Lim., Defd. Ord.	13/16–7/8	13/16–7/8
Mond Nickel Co., Lim., 7% Cum. Pref.	1–1 1/2	1–1 1/2
Do. 7% Non. Cum. Pref.	15/16–1 1/16	15/16–1 1/16
Pacific Phosphate Co., Lim., Ord.	4 3/4–5 1/8	4 7/8–5 1/8
Power-Gas Corporation, Lim., Ord.	3/4–7/8	3/4–7/8
Price's Patent Candle Co., Lim.	80–90	87–97
Salt Union, Lim., Ord.	1 13/32–1 17/32	1 7/16–1 9/16
United Alkali Co., Lim., Ord.	1 1/4–1 1/4xd	1 1/4–1 1/4xd
Val de Travers Asphalte Paving Co., Lim.	1–1 1/8	1–1 1/8
Van den Berghs, Lim., Ord.	3 9/16–3 13/16	3 9/16–3 13/16
Walkers, Parker & Co., Lim.	1 3/16–1 5/16	1 5/32–1 9/32
Welsbach Light Co., Lim.	2 1/8–2 3/8	2–2 1/4

Gas, Iron, Coal and Steel

Armstrong (Sir W. G.) Whitworth, Ltd., Ord.	37/0–38/0	37/0–38/0
Ebbw Vale Steel, Iron & Coal Co., Lim., Ord.	1 7/32–1 9/32	23/0–25/0
Gas Light and Coke Co., Ordinary Stock (4% Stand.)	58–61	58–61
Hadfield's, Limited, Ordinary	38/–40/0	38/0–40/0
South Metropolitan Gas Co., Ordinary (4% Stand.)	59/0–62/0	59–62
Staveley Coal & Iron Co., Lim., Ord.	1 13/16–1 15/16	1 13/16–1 15/16
Vickers, Limited, Ordinary	35/0–36/0	34/6–35/6

Mines, Nitrate, &c

Anglo-Chilian Nitrate and Rly. Co., Ltd., Ord.	13 1/2–14 1/2	15–16
Antofagasta Nitrate Co. Compañia de Salitres de Antofagasta) 5 1/2% 1st. Mt. Debs. Red.	88–93	88–93
Lagunas Nitrate Co., Lim.	1–1 1/2	1 1/2–1 3/4
Rio Tinto Co., Lim., Ord. (Bearer)	50–52	50–52
Tarapacá and Tocopilla Nitrate Co., Lim.	15/6–16/6	16/6–17/6

Oil and Rubber

Anglo-Java Rubber & Produce Co., Lim.	7/0–7/6	6/9–7/3
Anglo-Maikop Corporation, Ltd., Ord.	6/3–7/3	6/3–7/3
Anglo-Malay Rubber Co., Lim.	14/1 1/2–14/7 1/2	13/9–14/3
Anglo-Persian Oil Co., Lim., Cum. 6 % Part.	1 9/32–1 11/32	1 5/16–1 3/8
Burmah Oil Co. Ltd., Ord.	14 1/2–14 3/4	14 3/8–14 5/8
Chersonese (F.M.S.) Estates, Lim.	4/1 1/2–4/4 1/2	3/10 1/2–4/1 1/2
Mexican Eagle Oil Co., Lim. (Cia Mexicana de Pet. "El Aguila" S.A.) Ordinary	9 3/8–9 9/16	9 31/32–9 31/32
"Shell" Transport and Trading Co., Lim., Ord.	9 1/2–9 5/8	9 1/2–9 1/2
Do. 6% Cum. Pref.	9 3/8–9 5/8	9 1/2–9 3/4

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

LONDON GAZETTE.

Partnerships Dissolved

SCHOLFIELD, Thomas, and TODD, John Henry, chemical manufacturers, drysalters and tallow refiners, Lee Mill, Shawclough, Rochdale, Lancs., under the style of Sieber & Co., by mutual consent as and from August 31. All debts received and paid by Thomas Scholfield, who will carry on the business at Old Market Chambers, Yorkshire Street, Rochdale.

AMOS, Samuel Edward, and ASHWORTH, Wallace Noble, chemists, Weybridge, Surrey, under the style of Kennett, by mutual consent as and from March 31. All debts received and paid by Wallace Noble Ashworth, who will continue the business under the name of W. N. Ashworth.

Bankruptcy Information

RIDGWAY, John Alfred, residing at Clifton Villa, Stamford Road, Mossley, Lancs., works chemist. September 20.

Liquidators' Notices

THE BRITISH WATERPROOFING AND CHEMICAL CO., LTD.—A meeting of creditors will be held at 27, Brazennose Street, Manchester, on Monday, September 29, at 3 p.m. Joseph W. Shepherd and George W. Davies, Liquidators.

SAN MIGUEL COPPER MINES, LTD. (in Liquidation).—A meeting of creditors will be held at Room 7, Salisbury House, London, on Thursday, October 2, at 12 (noon). Budd, Johnson, Jecks & Colclough, Solicitors for the Liquidator. Creditors' claims on or before November 8, to Ernest Johnston, 295–8, Salisbury House, London, E.C.

THE PEAT, COKE AND OIL SYNDICATE, LTD. (in Voluntary Liquidation).—Creditors' claims on or before October 31 to Joseph H. Glover, liquidator, 6, Priory Place, Doncaster.

RUBEL BRONZE AND METAL CO., LTD.—A meeting of creditors will be held at 82, Victoria Street, Westminster, London, S.W. 1, on Monday, September 29, at 12 (noon). Harry S. Foster, liquidator.

Companies Winding up Voluntarily

ARAMO COPPER MINES, LTD.—Mr. Charles Whinfield Aston Key, 2, Metal Exchange Buildings, Leadenhall Avenue, appointed liquidator.

AMMONIA SODA CO., LTD.—Mr. Colin Marshall Skinner, Chartered Accountant, of Messrs. Jones, Crewdson & Youatt, 7, Norfolk Street, Manchester, appointed liquidator. A meeting of creditors will be held at 7, Norfolk Street, Manchester, on Tuesday, September 30, at 11.30 a.m. Creditors' claims on or before Friday, October 31 to Colin Marshall Skinner, 7, Norfolk Street Manchester.

THE WHEAL BELLAN TIN SYNDICATE, LTD.—Mr. Frederick John Broomfield, 108, The Exchange, Mount Stuart Square, Cardiff, appointed liquidator. A meeting of creditors will be held at 108, The Exchange, Cardiff, on October 7, at 11 a.m.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, created after July 1st, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

THAMES OIL WHARF CO., LTD., London, E.C.—Registered, September 15, mortgage or charge under the Land Transfer Acts, 1875 and 1897, supplemental to mortgage dated May 5, 1919, for securing £6,000, to Young & Marten, Ltd., 1, 3, and 5, Romford Road, Stratford; charged on land comprised in the conveyance dated May 5, 1919. *Nil. Dec. 1, 1917.

WEST HAM BOTTLE CO., LTD., London, E.C.—Registered September 10, mortgage or charge for securing all moneys due or to become due, but not exceeding £1,000, to Lloyds Bank, Ltd.; charged on freehold premises, 1-13 (odd) Granville Road, Canning Town. *£1,000. April 2, 1919.

Satisfaction

WEST HAM BOTTLE CO., LTD., London, E.C.—Satisfaction registered September 10, all moneys due, &c., registered July 18, 1919.

Joint Stock Companies

At the expiration of three months from September 19, the names of the undermentioned companies will, unless cause is shown to the contrary, be struck off the Register, and the companies will be dissolved.

Associated Films, Ltd.
Australasian Improved Chilling Syndicate, Ltd.
Barbados Oil Co., Ltd.
Coal Carbonising Parent Syndicate, Ltd.
Food Conserving and Milling Co., Ltd.
Glasgow Nut Margarine Co., Ltd.
Kintyre Coal and Oil Co., Ltd.
Manchester Nut Margarine Co., Ltd.
Medway Oil Mills Corporation, Ltd.
National Spanish Silver Lead Mines and Mining Co., Ltd.
Nottingham Nut Margarine Co., Ltd.
Oil Fuel Gas Generator, Ltd.
Oxfordshire Coalfields, Ltd.
Pen-y-Pass Copper Co., Ltd.
Russo-Roumanian Oil Co. (Société Russe-Roumano de Petrol), Ltd.
Trinidad Asphalt and Oil Syndicate, Ltd.
Ty Mawr Slate Quarry Co., Ltd.
United Kingdom Oilseed Products Association, Ltd.
WestAfrican Palm Oil Estates, Ltd.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.:—

BRITISH ASSOCIATION OF RESEARCH FOR COCOA, CHOCOLATE, SUGAR CONFECTIONERY AND JAM TRADES.—Nominal capital. Every member to contribute a sum not exceeding £5 if necessary. Directors: A. J. Boyd, 32, Eton Avenue, N.W.; W. G. Pascall, Somersly, Oakwood Avenue, Purley; J. W. Epps, Bucklands, Warlingham, Surrey, and 9 others.

BROWNSWORD & CO., LTD., 2, Bristol Street, Birmingham. Drysalters. Nominal Capital, £5,000 in 5,000 shares of £1 each. Directors, to be appointed by subscribers. Qualification of Directors, 1 share.

CROUCH'S PATENT LEATHER CO., LTD., Museum Station Buildings, 133 and 136, High Holborn, W.C. Tanners, curriers and leather dressers. Nominal capital, £25,000 in 20,000 preference shares of £1 each and 100,000 ordinary shares of 1s. each. Directors: W. H. Crouch; R. Thynne. Qualification of Directors, £100. Remuneration of Directors: W. H. Crouch, £200; R. Thynne, £300.

FEDERATION OF BONE USERS AND ALLIED TRADES, LTD.—To protect the interests of the glue, bone fertilizers, and bone charcoal trades in all their branches. Nominal capital: Every member to contribute a sum not exceeding £5. Members of Council: R. Duncalfe, Forge Mills, Bestwood Colliery, Nottingham; A. MacDonald, 72, Great Clyde Street, Glasgow; H. J. Cotes, Waterloo Works, Newcastle; and 7 others.

J. H. SQUIRE, LTD., 71, Hyde Road, Gorton, Lancaster. Manufacturing chemists, &c. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors: J. H. Squire, 319, Ashton Old Road, Openshaw, Lancaster (chairman); H. Squire, 71, Hyde Road, Gorton, Manchester. Qualification of Directors, £5. Remuneration of Directors, £260 chairman; others to be voted by company in general meeting.

KEITSLEY FELL GANISTER CO., LTD., 4, London Wall Buildings, E.C. To carry on the business of manufacturers of bricks, tiles and ceramic ware of all kinds. Nominal Capital, £25,000 in 25,000 shares of £1 each. Directors: To be appointed by subscribers. Qualification of Directors, 100 shares. Remuneration of Directors, £100 each.

LORRISTON SILICA BRICK CO., LTD., Ynisderw Road, Pontardawe, Glamorgan.—Silica brickmakers. Nominal capital, £10,000 in 200 shares of £50 each. Directors: F. W. Gilbertson, Llwynymor, Mumbles, Glam.; F. T. Thomas, Bolney House, Ennismore Gardens, S.W.7.

MARSH, ATWELL & CO., LTD., 15, Park Street, Camden Town, N.W. Manufacturers and dealers in optical instruments of all kinds. Nominal Capital £5,000 in 5,000 shares of £1 each. Directors: F. G. Marsh, 15, Park Street, Camden Town, N.W.; S. E. Atwell, 96, Turney Road, Dulwich, S.E.; G. G. Raphael, The Warren, Northwood, Middlesex. Qualification of Directors: 1 share.

MARTIN'S OILFIELDS OF MADAGASCAN (PARENT) CO., LTD., Clifford Chambers, 10, New Bond Street, W.—To acquire, sell, and dispose of oil and other concessions and property and the product thereof, most particularly in the Island of Madagascar. Nominal capital, £10,000 in 10,000 ordinary shares of £1 each. Minimum subscription, 7 ordinary shares. Directors: A. V. Ireland, 50, Cloverton Street, S.W.; W. S. Forbes, St. Nicholas, Kew Road, Richmond, S.W.; R. B. McNeily, Dashwood House, 9, New Broad Street, E.C. Qualification of Directors, 1 share.

MIDLAND DISTRICT TANNERS' FEDERATION. To promote develop, and protect the interests of the tanning trade. Nominal capital: Every member to contribute a sum not exceeding £10, if necessary. Members: T. W. Badgery, Lansdowne Crescent, Worcester; H. Scott Jones, Four Oaks, Warwickshire; C. Randall, Abbottfield, Kenilworth; and 9 others.

NORTHAMPTONSHIRE LEATHER CORPORATION, LTD, Bank Chambers, High Street, Kettering, Northampton.—Manufacturers and dealers in leathers. Nominal capital, £250,000 in 25,000 shares of £10 each. Minimum subscription, £20,000. Directors: C. W. Horrell, The Laurels, Wellingborough Road, Rushden; A. H. Bryan, "Westdene," The Headlands, Kettering; F. T. Riley, 25, Harborough Road, Desborough; and 6 others. Qualification of Directors, £1,200.

NORTH-WEST CANADA OIL AND GAS SYNDICATE, LTD., 13, Copthall Court, E.C. Oil producers and oil well proprietors and refiners. Nominal capital, £5,005 in 5,000 ordinary shares of £1 and 100 founders' shares of 1s. each. Directors: To be appointed by subscribers. Qualification of Directors, £100.

PREMIER BRIQUETTE CO., LTD., 80, Coleman Street, E.C.—Manufacturers of chemicals, manures, carbolic acid, creosote, and manufacture and sell patent fuel. Nominal capital, £125,000 in 120,000 preference ordinary shares of £1 each, and 100,000 ordinary shares of 1s. each. Minimum subscription, 7 shares. Directors to be appointed by subscribers. Qualification of Directors, other than First Directors, £500. Remuneration of Directors, £250 each. Chairman, £300.

SACOL CHEMICAL CO., LTD., Bankside, Sculcoates, Kingston-upon-Hull. Manufacturers of disinfectants and all kinds of chemicals. Nominal capital, £10,000 in 6,000 cumulative 10 per cent. preference shares and 4,000 ordinary shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, 100 shares.

SCARAB OIL BURNING CO., LTD.—Manufacturers and dealers in metal and minerals, petroleum, and other mineral oils. Nominal capital, £250,000 in 250,000 shares of £1 each. Minimum subscription, 7 shares. Directors: F. R. Macdonald, 49a, Pall Mall, W.1; C. A. Mills, Moulsford Manor, Berks; W. F. Jackson, Crecksea Place, Burnham-on-Crouch. Qualification of Directors, £250. Remuneration of Directors, £250 each. Chairman, £300.

SHEARMAN & SHELTON, LTD. Manufacturing chemists and chemists and druggists. Nominal capital, £6,000 in 6,000 shares of £1 each. Directors: F. A. Hanworth, Oulton Broad, Lowestoft, Suffolk; Elizabeth C. Hanworth, Silfield, Wymondham, Norfolk; Florence M. Hanworth, Silfield, Wymondham, Norfolk. Qualification of Directors, 1 share.

WESTERN COUNTIES BASIC SLAG CO., LTD.—Slag manufacturers. Nominal capital, £50,000 in 50,000 ordinary shares of £1 each. Directors to be appointed by subscribers. Subscribers: F. S. Askew, 601, Tower Buildings, Liverpool; T. E. H. Jones, 91, Penkett Road, Wallasey.

WILLIAM BARNARD & SONS, LTD., 66, Fenchurch Street, E.C. Glass bottle factors and agents. Nominal capital, £10,000 in 10,000 shares of £1 each. Directors: W. J. Asquith, H. S. Jessop, G. Asquith, H. H. Asquith. Qualification of Directors, 1 share. Remuneration of Directors, £25 each.

For Sale or Wanted

(Three lines, 3s.; each additional line, 1s.)

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OIL AND COLOUR CHEMISTS' ASSOCIATION. The first meeting of the 1919/1920 session will be held at the Food Reform Club, 2, Furnival Street, Holborn, London, E.C., on Thursday, October 9th, 1919, at 7 p.m. Two papers will be given by Mr. A de Walle entitled (*a*) Notes on the permeability of Paints and Varnishes, (*b*) A Suggested method for calculation of costs of Ready Mixed Paints. The Council of the Association will be pleased to welcome to this meeting chemists engaged in the Oil and Colour industries.

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